Introduction

Major sections of this manual are separated by the large black bars as seen above and below. Subsections are titled in this lefthand column. Notes, definitions, and other information also appear in this column

The model FI-127 is a versatile, full-featured indicator housed in a stainless steel enclosure. Its user interface includes an 8-digit, 7-segment LED display, fourteen LED annunciators, and 24 keys.

This manual is divided into the following major sections:

- Introduction
- Operating Modes
- Front Panel
- Error Messages
- Using Your FI-127
- Using the User Menu
- Using the Service Menu
- Reset Menu/Master Clear
- Adding and Calibrating a Loadcell
- Step by Step Instructions
- Freeze Force Function
- Data Capture

Operating Modes

There are three modes of operation for the FI-127—Display mode, User Menu mode and Service Menu mode.

In Display mode you perform all normal force measurement operations.

The User and Service menus give you access to testing modes, configuration of your system, database and system information. This manual explains how to use these different modes of operation.

Front Panel

The FI-127's front panel consists of 24 keys and fourteen annunciators.

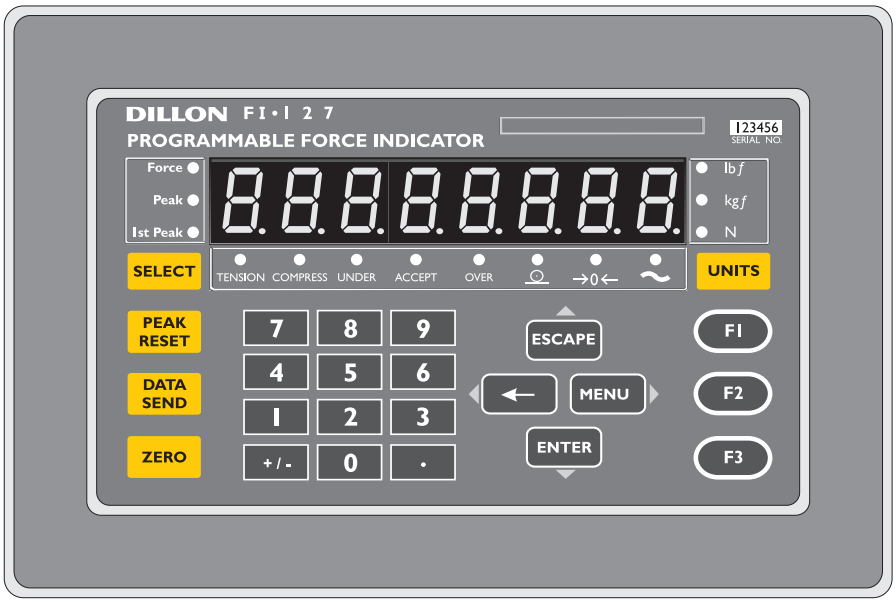


Figure 1
FI-127 Front Panel

Keys

Standard Instrument Keys

The FI-127's keys are divided into four primary groups:

Standard Instrument Keys These yellow keys are common to a majority of applications and include SELECT, PEAK RESET, DATA SEND, ZERO, and UNITS. The SELECT and UNITS keys are placed next to the annunciators they affect.

SELECT Use to switch between force, peak ad first peak display modes. **SELECT** can also be used to accept a current selection and return to weigh mode from within any menu.

PEAK RESET Use to reset all peak and first peak values. This key may also be used to capture the current measurement as an entered value during data entry.

DATA SEND Use to initiate one or more serial outputs.

ZERO Zeros the scale in the display mode. Also clears values in numeric entry.

UNITS Switches the units of measure in the display mode. Up to three units of measure are selectable.

Function Keys

Function Keys These oval keys along the right side of the display face are configurable and are labeled F1, F2, and F3. The default configurations for these keys are:

F1 Allows load cell selection
F2 Allows entry of ID number
F3 Allows access to cutoff registers.

Keypad Keys

Keypad Keys These are the twelve square keys which support numeric entry. The keyboard keys are labelled 0-9, plus/minus (+/-), and decimal point (.) and are located near the center of the display face.

+/- This key is used to change the sign of a numeric entry, enter a dash in ID entry, and insert when editing lists. This key also initiates numeric entry, except in display mode where it serves to toggle between tension and compression for bidirectional cells. Toggling between tension and compression resets peak, first peak and break detect; unfreezes the force display; and halts data capture.

Directional Keys

Directional Keys The directional keys are used to navigate through the FI-127's menus. These keys are labeled **ESCAPE** (up), **ENTER** (down), ← (left), and **MENU** (right) and are positioned in a compass-like cluster on the display face. These directional keys are denoted by the small transparent arrows located next to them. **ESCAPE**, **ENTER**, and ← also support numeric entry.

ESCAPE Exits a menu parameter without saving any changes. This key moves up within a menu. In display mode, **ESCAPE** "unfreezes" the force display.

ENTER Used to end digit entry, accept a change made, or select an item from a function list. **ENTER** moves down within a menu. When in display mode, **ENTER** "unfreezes" the force display.

← Backspaces (deletes the last digit or punctuation mark entered) while in numeric entry and moves left within a menu.

MENU Accesses user menus and moves right within a menu.

Annunciators

The FI-127 has fourteen annunciators.

Force Illuminates when indicator is in force display mode.

Peak Illuminates when indicator is in peak display mode.

1st Peak Illuminates when indicator is in first peak display mode.

lb*f*, kg*f*, N Illuminates the active unit of measure in weighing mode.

⊙ **Data Send**: Illuminates when the indicator is transmitting data. Does not illuminate when a host connection is communicating with the indicator or with continuous send.

→0← **Zero**: Illuminates when the scale is within the configured center of zero.

~ **Motion**: Illuminates when the scale detects motion (within configured motion window).

Under, Accept, Over Specific application annunciators.

Tension Indicates the type of force being measured.

Compression Indicates the type of force being measured.

Error Messages

The following are displays you may see if problems occur or if invalid operations are attempted with your FI-127:

Display	Description
O. LoAd	Overrange force.
_ _ _ _ _ _	Underrange force.
- - - - - -	Recovering from lock-up or out of range condition.
Loc' up	A-D converter is not functioning.
L.C. Error	A-D converter subjected to an input signal beyond ±5.00000 mV/V
Can't	The unit cannot perform a function. Displayed only while key is held down.
Flashing *	Corrupted data in the reset menus. See the *Service Manual*. (* = RESET, SETUP, or CAL)
Sealed	Displayed while a key is pressed when attempting to modify a sealed selection without edit privileges.
Auto. 0	Displayed while waiting for a stable, valid weight to use as a zero reference on power-up.
Lo. Volt	Displayed when input voltage to excitation regulator drops below 10.5 VDC. Will clear when input voltage rises above 11.5 VDC.
1 Busy	Displayed when the ready/busy handshake has exceeded its time out limit. Default is 2 seconds. This can also apply to optional 2nd and 3rd serial ports.
Ouch	Displayed when the force applied to the load cell has exceeded the level considered to be abusive to the load cell.

Using Your FI-127

Setting Up Your FI-127

Your FI-127 will probably be ready to use when you receive it from your Dillon distributor. Connect the loadcell to the 7-pin connector on the back of the unit. Connect your RS-232 communication equipment to the other connector on back of the FI-127. Power up your peripheral equipment and plug in the FI-127 to an appropriate grounded power source.

The indicator will power up in Display mode with annunciators lit for your application. From the factory, the default annunciators which are lit are *Force*, *Tension* and *lb F*. The center of zero (COZ) annunciator should also be lit. If the display does not show 0 or the COZ annunciator is not lit, press the **ZERO** key.

Your unit is now ready for use in your force measurement application. If you want to add a loadcell, see the section *Adding a Loadcell* later in this manual.

Performing a Force Measurement

1. With the indicator powered up, select the unit of measure you want to use by pressing the **UNITS** key. . .

   The proper annunciator will light.

2. Press the **ZERO** key if the display does not show 0 and apply force to the loadcell. . .

   The force will be displayed in the unit of measure you have chosen. The type of force, tension or compression, will be indicated by the annunciators under the display. The motion annunciator will be lit while the indicator detects motion.

3. If you are running a test where First Peak and Peak readings are important to you, you can see those values by pressing the **SELECT** key. The value on the display will correspond to the annunciated item on the left side of the display panel. See the First Peak definition at left.

4. After you have seen the peak values, you can reset them by removing the force from the load-cell and pressing the **PEAK RESET** key.

5. Repeat steps 2-4 for the other force measurements you want to make.

First Peak
First peak is defined as an applied force, followed by a drop in force of at least x% of full capacity followed by an ultimate peak in force. x is called the capture percentage. You can set this percentage via the front panel. Instructions can be found in the section Using the Service Menu*. See the graphed example in Figure 2.*

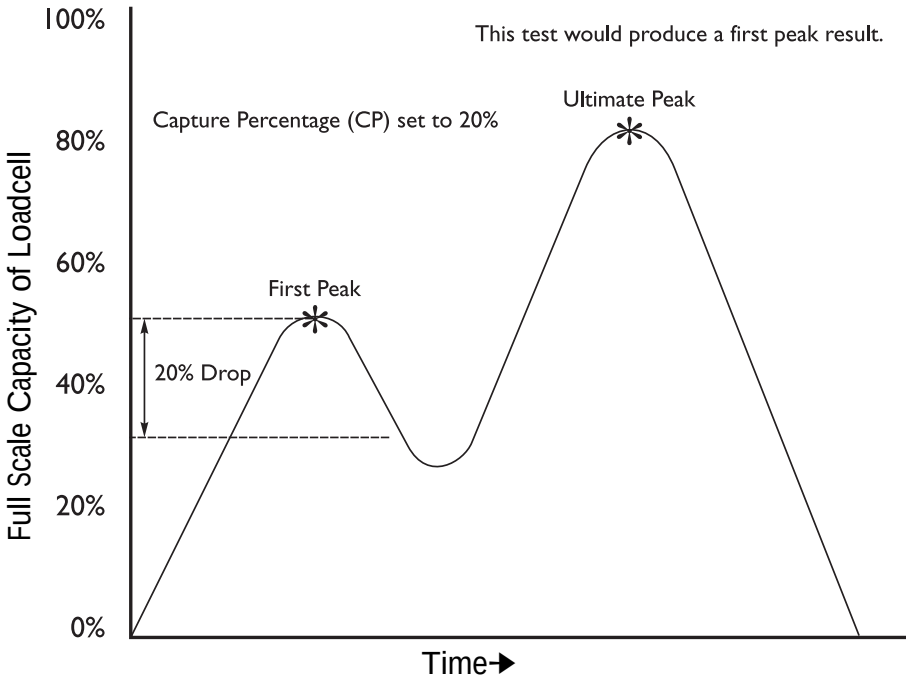


Figure 2
First peak illustration

Using the Function Keys

The function keys are used for

- **F1** Loadcell selection
- **F2** ID number entry
- **F3** Viewing or entering data in cutoff registers

F1 Key

1.	Press **F1** key. . .	The display shows the current cell number and a letter showing if the cell type is F for force or T for torque.
2.	Press the **ENTER** key. . .	The capacity of the current cell is displayed.
3.	Press the **MENU** key. . .	The division size for the current cell is displayed.
4.	Press the **ENTER** key to return to Display mode or press the **ESCAPE** key to return to the display from step 1.	

F2 Key

1. Press the F2 key. . . — The current ID number is displayed.

2. Press any of the following keys to return to Display mode: **F2**, ←, **MENU**, **ESCAPE**, **SELECT**

or

press a number key to start entering a new ID number. When you are finished, press the **ENTER** key. . . — The new number will become the active ID number.

F3 Key

The F3 key is used to view and change cutoff registers. You can view cutoff registers by two methods:

Cutoff Register
A cutoff register is a force value you enter into memory (register) which the indicator uses to control outputs. There are 10 cutoff registers in the FI-127. You can set ten different force values which the indicator will use to trigger outputs.

When activated (force on the loadcell is less than the force in the cutoff registers), these cutoffs are all on at the same time. Each cutoff will deactivate as soon as the force on the loadcell matches the value in each cutoff register.

When the force is equal to or greater than positive register values, or more negative than negative register values, the corresponding output is disabled.

When the force is less than the positive register values, or less negative than negative register values, the corresponding output is enabled.

Method A:

1. Press the **F3** key. . . — ***1 xx*** is displayed. The number ***1*** stands for cutoff register #1 and ***xx*** is the current value in register 1.

2. Continue pressing **F3** or **MENU** to scroll forward or ← to scroll backward through the remaining cutoff registers.

Method B:

1. If you know which cutoff register you wish to view, press the number of that register, then press **F3**. That particular cutoff register is displayed.

To change a cutoff value, display the register you want to change then:

1. Key in a new value with the numeric keypad. Use the **+/-** key to change the sign of the value.

   Press the **ENTER** key to accept the new value and return to Display mode

or

   press the **F3** key to accept the new value and move to the next register.

2. To deactivate or clear a cutoff value, set the value to zero.

Using the User Menu

Use these keys to navigate through the menus:

ESCAPE = up
ENTER = down
← = left
MENU = right

The FI-127 has two menus—the user menu and the service menu. The service menu is covered later in this manual. You use it to configure the operation of your indicator. The user menu, shown in Figure 3, allows you to do the following things:

- Capture and view data points
- Print a report on data points
- View statistics about captured data points
- Delete captured data points
- View the current time and date
- View and delete database records
- See live display of loadcell output in counts or mV/V
- Set Target, Under, and Over values

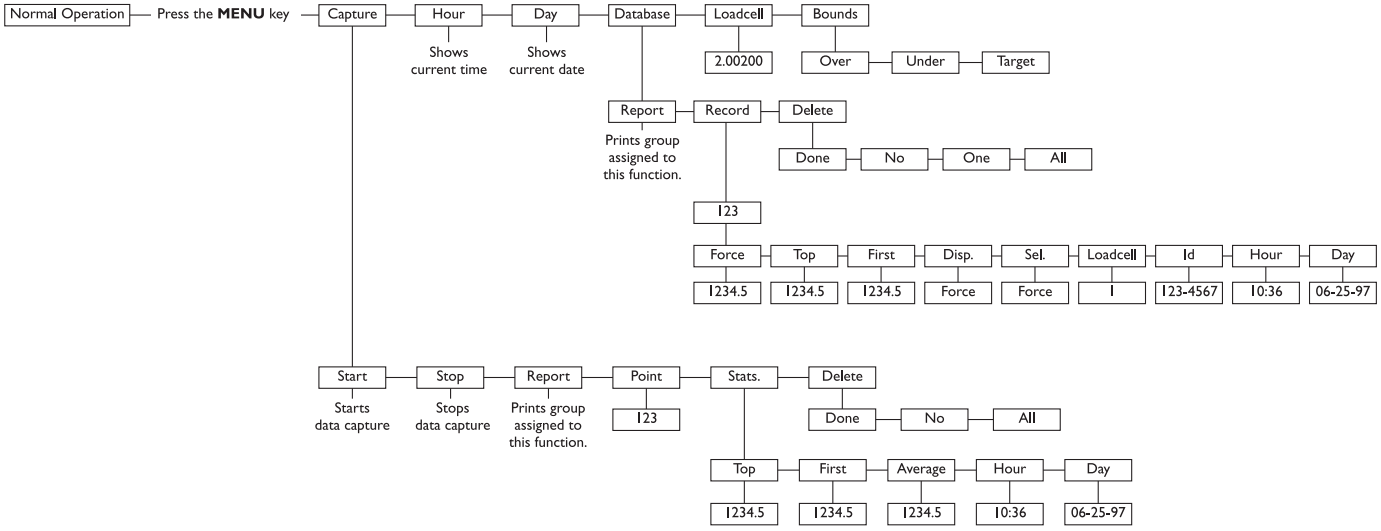


Figure 3
User menu

The User Menu

Following are instructions for accessing and using the user menu. Refer to Figure 3 as you go through these instructions.

Capture

This manual assumes that all functions are enabled. Your indicator may not show some of the items in the user menu because your configuration does not enable them. See the Using the Service Menu *section to reconfigure your system.*

1. Press the **MENU** key. . . — ***CAPturE*** is displayed. This is the first menu item. Use this to start and stop capturing data points, view captured points, see statistics on captured points and to delete the points.

2. Press the **ENTER** key. . . — ***StArt*** or ***StoP*** is displayed depending on if you are currently capturing data points or not.

3. Press the **ENTER** key to start or stop capturing data points. . .

   The indicator will start or stop capturing data points.

4. Press the **MENU** key to move to the next menu item. . .

   rEPOrt is displayed. Use this to print a report on the data capture information.

5. Press the **ENTER** key with this displayed if you want a preconfigured set of information to be sent through the serial port.

6. Press the **MENU** key to move to the next menu item. . .

   Point is displayed. Use this to see any captured data point.

7. Press the **ENTER** key to view the current point number. Press ← or **MENU** to scroll to other points. With the point you want displayed, press the **ENTER** key to see the value of that data point. . .

   The captured point will be displayed as well as the unit of measure and tension/compression annunciators.

8. Press the **MENU** key to move to the next menu item. . .

   StAtS. is displayed. Under this item you can see statistics on the captured data points.

Remember to use the direction keys to navigate among the levels and choices in the menu structure.

Press **SELECT** *to accept the current selection and return to the Display mode from anywhere in the menus.*

9. Press **ENTER** to see the first item in the list of statistics. Press the ← or **MENU** to move to other stat. items and press **ENTER** to see the value for the displayed statistic. Following are the statistics and what they show you:

   Top Peak value for the currently captured points.

   First Shows the first peak value for the currently captured points.

   Average Shows the mean value of the currently captured points. Does not include those points which are below the data capture threshold set in the **Ave. Over** parameter of the setup menu. See the *Service Manual*.

   Hour Time at which the data was captured.

   Day Date on which the data was captured.

Use these keys to navigate through the menus:

ESCAPE = up
ENTER = down
← = left
MENU = right

	10. After viewing the statistics, press the **ESCAPE** key until ***StAtS.*** is displayed, then press **MENU** to see the next menu item. . .	***dELEtE*** is displayed. Use this to delete all captured data points.
	11. Press the **ENTER** key. . .	***donE*** is displayed if there are no data point to delete. All is displayed if there are data points to delete.
	12. If there are data points to delete and you want to delete them, press **ENTER** while ***All*** is displayed. . .	The data points are deleted from memory and ***donE*** is displayed.
Hour	13. Press **ESCAPE** twice to return to the ***CAPturE*** display. Press **MENU** to move to the next user menu item. . .	***Hour*** is displayed.
	14. Press **ENTER** to see the currently set time. . .	Time is displayed as ***HH:MM:SS*** (24 hour clock) or ***HH:MM:SS AM*** (12 hour clock). You may toggle between the two formats by pressing the **UNITS** key.
	15. Press **ENTER** or **ESCAPE** to leave the time and format unchanged or enter a new time using the numeric keys.	
	16. After changes have been made to the time, press the **ENTER** key to accept them and start the clock. . .	Display shows ***Hour***.
Day	17. Press the **MENU** key to go to the next menu item. . .	***dAY*** is displayed.
	18. Press **ENTER** to see the currently set date. . .	The date is displayed as MM/DD/YY.
	19. Press **ENTER** to accept this date or key in a new date and press **ENTER** to accept it. . .	***dAY*** is displayed.

Database

20. Press the **MENU** key to go to the next menu item. . .	***dAtAbASE*** is displayed. Under this menu item you can send a preconfigured report of database items to a serial port, look at individual records in the database and delete one or all of the records.
21. Press the **ENTER** key. . .	***rEPOrt*** is displayed. Use this to send a report to a serial port. The information sent depends on the configuration of your system. See the Service Manual for instructions.
22. Press the **ENTER** key to send the database information to the serial port. . .	The print annunciator will light then the display will show ***dAtAbASE*** again.
23. Press **ENTER** then **MENU** to go to the next menu item under ***dAtAbASE***. . .	***rEcord*** is displayed.
24. Press the **ENTER** key to access the current record. . .	A record number is displayed.
25. You can view this record's data by pressing the **ENTER** key or you can access other record numbers by pressing the ← or **MENU** key, then press the **ENTER** key. . .	The first item in the database record is displayed. What this item is depends on the configuration of your database.
26. Use the ← or **MENU** key to scroll through the list of items, then press the **ENTER** key to view the value for each item,	

Use these keys to navigate through the menus:

ESCAPE = up
ENTER = down
← = left
MENU = right

Below is a full list of items in default order:

Force A stored force measurement. Displayed with unit of measure and tension/compression annunciators.

Top A stored peak value. Displayed with unit of measure and tension/compression annunciators.

First A stored first peak value. Displayed with unit of measure and tension/compression annunciators.

Disp. A stored measurement. May be Force, Top or First depending on configuration. Press the **ENTER** key again to see the value. Displayed as ***F 1234.5*** if the stored value is a frozen force. Displayed with unit of measure and tension/compression annunciators.

Sel. A stored measurement. May be Force, Top or First depending on configuration. Press the **ENTER** key again to see the value. Displayed with unit of measure and tension/compression annunciators.

Loadcell A stored loadcell number.

Id A stored ID number.

Hour Time the record was stored.

Day Date the record was stored.

27. Press **ESCAPE** until ***rEcord*** is displayed, then press the **MENU** key to move to the next item in the database submenu. . . — ***dELEtE*** is displayed. Use the items under this to delete one or all the records.

28. If you choose to delete one record you can scroll through the records using the ← or **MENU** keys then press the **ENTER** key to delete that one record. . . — ***dELEtE*** is displayed.

29. With ***dELEtE*** displayed, press the **ESCAPE** key. . . — ***dATAbASE*** is displayed.

Loadcell

30. Press the **MENU** key to move to the next user menu item. . . — ***LOAdCELL*** is displayed.

31. Press the **ENTER** key to see a live display of loadcell output in either mV/V or counts. Toggle between the two views using the **UNITS** key.

Bounds

Target, Over, Under Example
Target value = 350
Under value = -10
Over value = 20

With these settings the ACCEPT annunciator will be lit when force is 340 to 370. The UNDER annunciator will be lit when force is less than 340. The OVER annunciator will be lit when force is greater than 370.

32. Press the **ESCAPE** key to return to the ***LOAdCELL*** display, then press **MENU** to move to the last user menu item. . .	***boundS*** is displayed. Use this item to set target, over and under values. See example at left.
33. Press the **ENTER** key. . .	***OVEr*** is displayed.
34. Press **ENTER** to see the current value. Key in a positive value then press **ENTER** to accept it. . .	***OVEr*** is displayed.
35. Press **MENU** to display ***UndEr***. Press **ENTER** to see the current value. Key in a negative value then press **ENTER** to accept it. . .	***UndEr*** is displayed.
36. Press **MENU** to display ***tArGEt***. Press **ENTER** to see the current value. Key in a value then press **ENTER** to accept it. . .	***tArGEt*** is displayed.
37. This is the last item in the user menu. Press **ESCAPE** repeatedly or **SELECT** to return to Display mode.	

Using the Service Menu

Be sure to key in the password '127' before pressing and holding the **ESCAPE** *key if you want to change items in the service menu, otherwise you will only be able to view them.*

You use the service menu to see information about your indicator, to test its various functions and to configure how you want the system to work. Figures 4 through 19 show the service menu structure in the FI-127. Following each figure are explanations for each of the service menu items. Use the same methods to get around in the menu structure as you used in *Using The User Menu* section of this manual. **To edit items in this menu you must key in '127' before pressing and holding the ESCAPE key.**

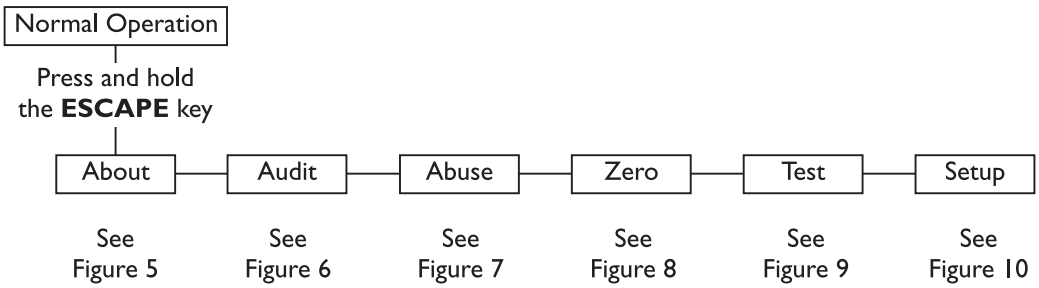


Figure 4
Top level of the Service menu

About **Menu**	Information about the software
Audit **Menu**	Audit counters for calibration and configuration
Abuse **Menu**	Loadcell overload counters
Zero **Menu**	Zero balance information and reset
Test **Menu**	For testing the hardware of the indicator
Setup **Menu**	For configuration of the indicator

About Menu

Figure 5
About menu

These are the items listed in the About menu:

127 The unit designation.

12345 Parent part number of the software.

-1234 The dash portion of the software part number.

Rev. A The revision level of the software.

Audit Menu

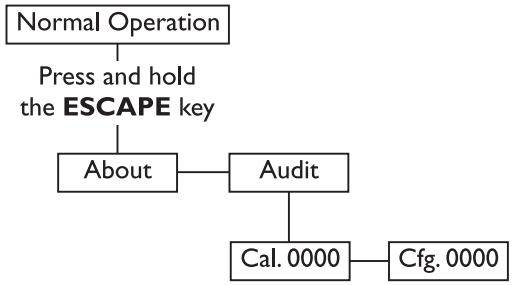


Figure 6
Audit menu

These are the items listed in the Audit menu:

Cal. 0000 This is an example of how the calibration audit trail counter will appear. The actual value will be between 0000 and 9999. It is nonresettable and may not be edited.

Cfg. 0000 This is an example of how the configuration audit trail counter will appear. The actual value will be between 0000 and 9999. It is nonresettable and may not be edited. The counter is incremented each time a metrological item is modified in the setup menus and saved and so may be used as a control audit.

Abuse Menu

Be sure to key in the password '127' before pressing and holding the **ESCAPE** *key if you want to change items in the service menu, otherwise you will only be able to view them.*

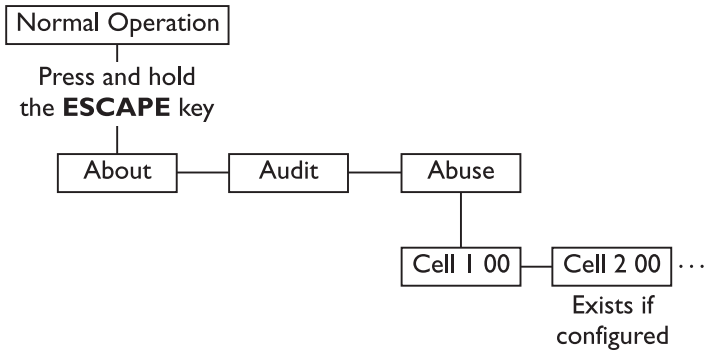


Figure 7
Abuse menu

Cell 1 00 This is an example of how a loadcell overload counter appears. Use the ← or **MENU** keys to view other loadcells you may have. The counter shows up to 99 overloads. An overload is defined as an applied force beyond the threshold configured under **Abused** in the loadcell configuration section of the service menu. The overload counter can only be reset at the factory.

Zero Menu

This menu provides access to zero balance information and reset.

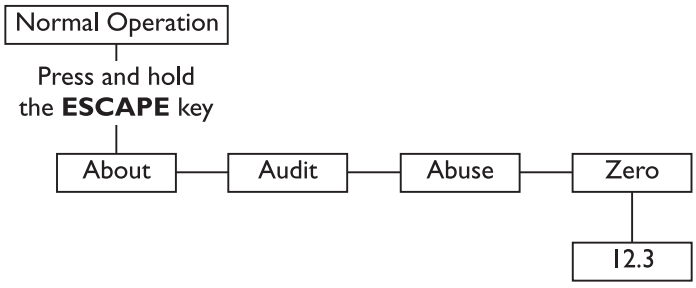


Figure 8
Zero menu

12.3 This is an example of the offset between the current zero balance and the zero balance value established in calibration. Displayed offset = Calibration zero - Current zero

When you press the **ZERO** key the current balance is reset to calibration zero and resets the peak and 1st peak. The force display is also unfrozen.

Test Menu

The test menu, shown below, gives you access to diagnostic tests.

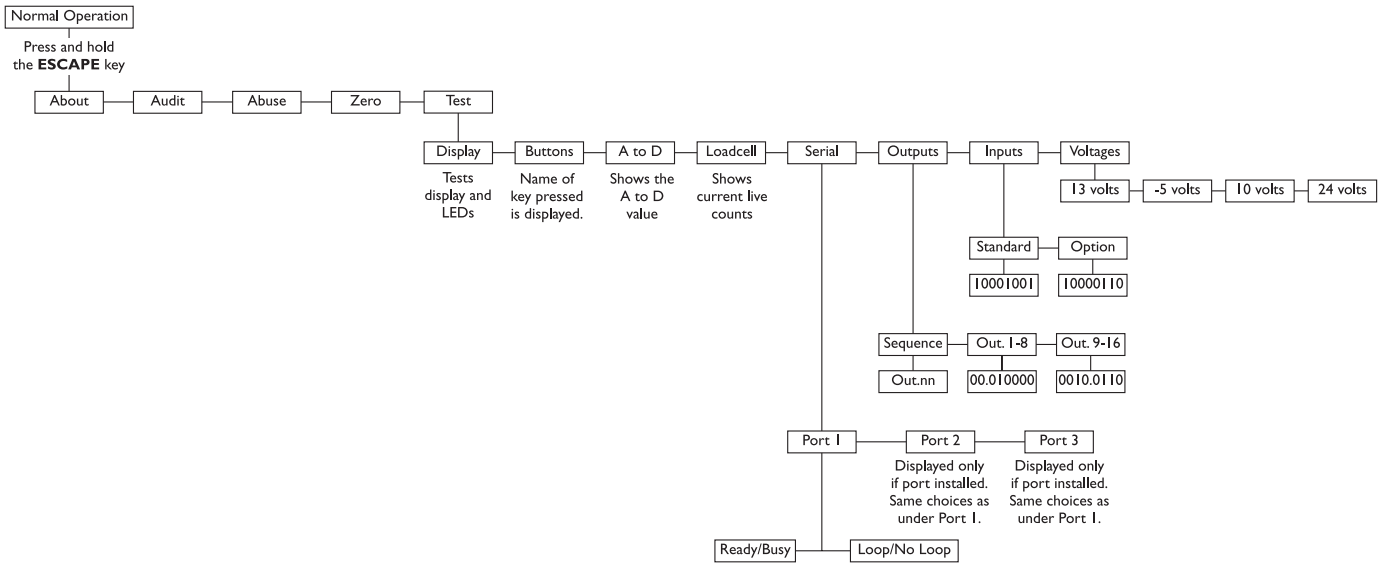


Figure 9
Test menu

These are the items listed in the Test menu from left to right:

Display — Press **ENTER** to start and stop a continuous display test. With the test stopped press the ← or **MENU** key to move backward or forward one step at a time. Press **ENTER** again to resume the automatic test or press **ESCAPE** to stop the test and return to ***diSPLAy***.

Buttons — This provides a test of the keypad. The name of the key that is pressed appears on the display. If no key is pressed, ***nOnE*** is displayed. Press **MENU** to return to ***buttonS***.

A to D — Press this key to see the current A to D value. The displayed resolution is 1 part in 20,000 per mV/V. This test exists so that the offset and gain of the electronics can be checked. The offset is initially set to the nominal offset of the electronics, but you can press the **ZERO** key to establish the actual offset, allowing the gain to be evaluated.

Loadcell With ***LOAdCELL*** displayed, press the **ENTER** key to see a live display of the current counts coming from the A-D converter. ***400400*** is an example of how this might appear. Press the **UNITS** key to toggle between the counts display mode and the mV/V display, which appears in this format: **2.00200**. This stands for 2.002 mV/V. The decimal indicates you are looking at mV/V and not current counts.

Serial This item accesses the internal port serial tests. With ***SEriAL*** displayed, press the **ENTER** key. ***Port 1*** is displayed. This is always the internal serial port. When the optional serial boards are installed in the same stack, port two is always on the bottom. When installed in different stacks (side by side), port two is always closest to the power supply. Press the ← or **MENU** key to select the port you wish to test.

Ready/ Busy With the port you want to test displayed, press the **ENTER** key. ***rEAdy*** or ***bUSy*** is displayed telling you if the hardware input line is ready or busy. This is useful in tracking down serial output problems.

Loop/ No Loop Press the **MENU** key to see the Loop - No Loop test. Connect the transmit line to the receive line at some point in the cabling. The FI-127 checks if it receives the same characters that it transmits. If it can, ***LOOP*** is displayed. If it cannot, ***no LOOP*** is displayed. This is useful in isolating serial output problems to the FI-127, cable, or connected device by looping back at the corresponding points.

With motors connected to external circuits, this is a good way to test your hardware.

Outputs This test allows you to check the operation of the onboard and optional outputs. The onboard outputs are copies of the first three outputs on the optional I/O board when it is installed.

Sequence This is the first item in the Outputs submenu. Press the **ENTER** key to test the outputs. Each output is turned on and off sequentially. The display will show ***Out. nn***. The ***nn*** being the number of the output being tested. The outputs will sequence every half second. Press the **ENTER** or **ESCAPE** key to end the test and return to the ***SEqUEnCE*** display.

Out 1-3 (or 1-16 with optional boards)

This is the second item in the Outputs submenu. This allows you to activate or deactivate any of the outputs 1-3 (1-16 if the optional boards are installed). Press the **ENTER** key to see the display of the outputs status.

The screen has 0s and 1s displayed in this format: ***00.010000***. In this example, output #4 is active. The zeros and ones represent the status of each output. A ***1*** means it is activated and a ***0*** means it is deactivated. The left digit is output #1 or #9.

To change the status of an output, press the ← or **MENU** key to move the decimal point to the right of the output you want to change. Press the **ENTER** key to toggle the output from one status to the other.

To exit back to Display mode, press the **SELECT** *key and save changes as needed by pressing* **ENTER** *with* ***SAVE****? displayed.*

This allows you to test your remote push button switches (ie. remote zero, print, etc.)

Press the **ESCAPE** key to exit the test. The outputs remain as selected until you exit the Test menu. Returning to Display mode returns the control of the outputs to the cutoff values.

Inputs This test allows you to check the operation of the onboard and optional inputs. Press the **ENTER** key to access the submenu.

Standard This submenu item lets you check the status of the onboard inputs. In this example, ***1000100***, inputs #1 and #5 are active. The inputs are ordered 1-8 from left to right. A ***1*** means activated and a ***0*** means deactivated.

As you view the inputs, #8 is actually a flag that is dependent on the states of inputs 6 and 7. Input 6 resets flag #8 to a false 0. Input 7 sets flag #8 to a true 1. Input 8 does not terminate at a connector.

Option This menu item is available only if the option board is installed. It works the same way as the **Standard** example above.

Voltages The submenu under ***VoltAgES*** lets you see the power supply voltages. The voltage readings are updated 2 times per second.

13 volts This test displays the unregulated weight sensor excitation power supply voltage. If the voltage drops below 10.5 the display will show ***Lo. Volt***. The error condition will not clear until voltage reaches 11.5.

- 5 volts This test displays the -5 volt excitation voltage.

10 volts This test displays the unregulated 5 volt logic supply voltage.

24 volts This test display shows the relay supply voltage. If this voltage drops too far it may not be possible to activate certain relays. Nominal level for this power supply voltage is 22.8.

Setup Menu

Be sure to key in the password '127' before pressing and holding the **ESCAPE** *key if you want to change items in the service menu, otherwise you will only be able to view them.*

The setup menu allows you to configure your indicator to your specific application. Each item in this menu is described in the order presented in Figure 10.

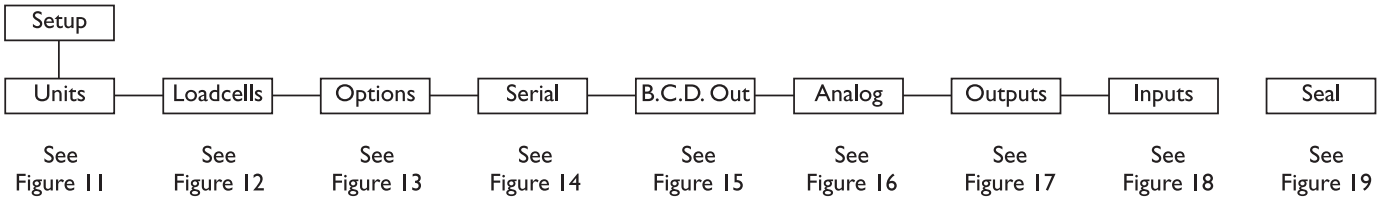


Figure 10
Setup menu

Units submenu

The first submenu under Setup is Units. This submenu lets you select what unit of measure will be assigned to the three annunciators on the front panel.

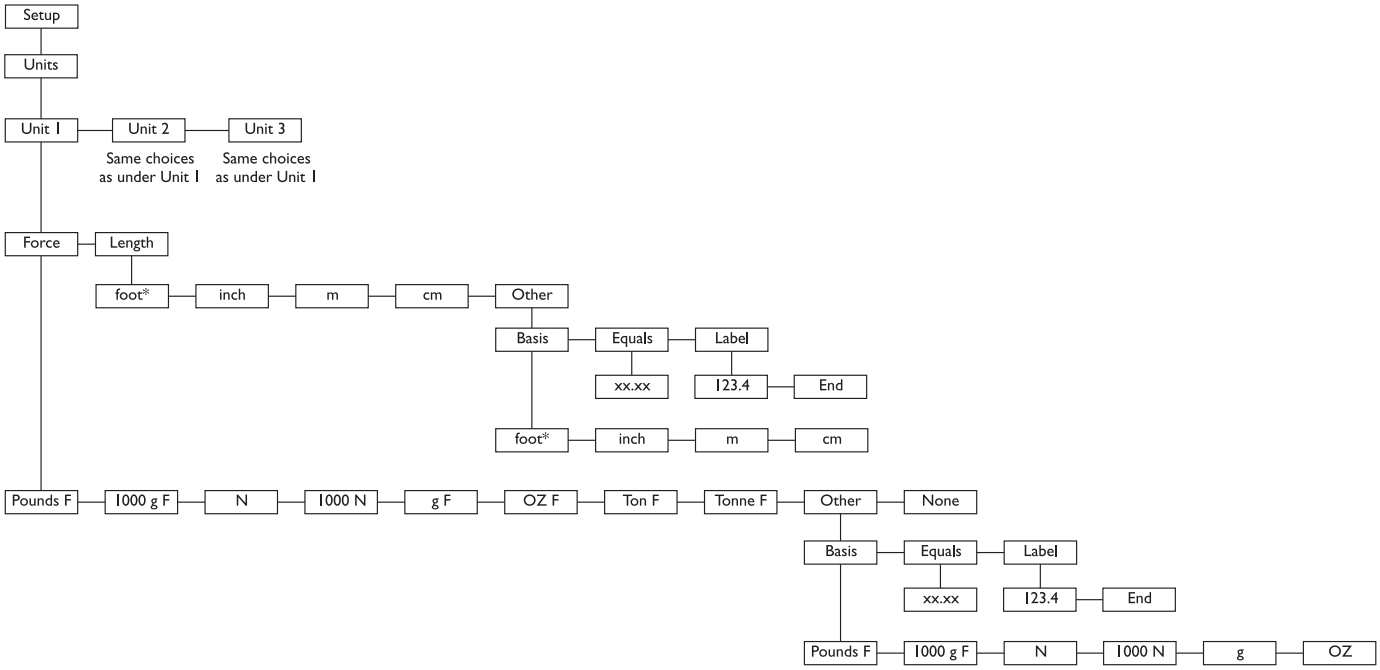


Figure 11
Units submenu

** = default value*

To exit back to Display mode, press the **SELECT** *key and save changes as needed by pressing* **ENTER** *or* **SELECT** *with* ***SAVE****? displayed.*

To exit without saving changes, press ← *or* ***MENU*** *until* ***No Save*** *appears then press* **ENTER** *or* **SELECT**.

Units

Unit 1 The unit of measure you choose for this item will be assigned to the annunciator labeled "lb f" on the front panel. You can also choose a length unit of measure for torque loadcells. Following is the list of units of measure:

Pounds F* = pounds force
1000g F = kilograms force
N = Newtons
1000 N = 1000 Newtons
g F = grams force
OZ F = ounces force
Ton F = tons force
Tonne F = tonnes (metric tons) force
Other = Allows you to define a custom unit of force. Choose what unit of force you want it based on, a multiplier upon which the custom unit is based and an ASCII label to be used in serial output. See the example at the bottom of this page.
None = no unit of measure is assigned.

Following is the list of length units of measure you can choose:

foot* = foot
inch = inch
m = meter
cm = centimeter
other = Allows you to define a custom length unit. Choose what unit of length you want it based on, a multiplier upon which the custom unit is based and an ASCII label to be used in serial output.

Unit 2 The unit of measure you choose for this item will be assigned to the annunciator labeled "kg f" on the front panel. You have the same choices as shown in Unit 1 above. 1000g F is the default setting.

Unit 3 The unit of measure you choose for this item will be assigned to the annunciator labeled "N" on the front panel. You have the same choices as shown in Unit 1 above. N is the default setting.

Custom Unit Example:

If you want a unit of measure called PLUTOs that is equal to 3.5 pounds of force you need to enter the ASCII codes for P, L, U, T, and O. (See Appendix A). Enter pounds as the unit of measure the custom unit is based on and enter 3.5 as the multiplier so that 1 PLUTO will equal 3.5 pounds.

Loadcells submenu

The next Setup submenu is Loadcells. Use this menu, shown in Figure 12 to linearize and configure each loadcell in your system.

Cell 1 This is the first loadcell in a list of loadcells. Cell 2, Cell 3, etc. are available by pressing the **MENU** key if they are configured. To add loadcells to the system, press the ***+/-*** key while ***End*** is displayed. To delete the last loadcell from the list, press **ZERO** while that Cell # is displayed. The FI-127 supports up to six loadcells.

Below are the descriptions of the items available under each configured loadcell.

Cell Type Choose which type of loadcell you are using: Force or Torque.

Polarity Select the direction of positive measurement:
Regular - selects tension for force and clockwise for torque.
Counter - selects compression for force and counter clockwise (CCW) for torque.
Bi-dir. - specifies that the loadcell is bidirectional and is used for measuring force in both tension and compression, or torque in both CW and CCW directions. This selection enables the ***+/-*** key to change measurement direction while in the display mode.

Calibration is part of the Linearize process. See the section titled *Adding and Calibrating a Loadcell* for more detailed instructions on calibrating your loadcell.

☞ **Linearize**

Points Use this submenu to view, edit, add, or delete calibration points in a list. You may have 2-10 points per loadcell with a maximum of 35 points among all six available cells.

A 0
A 5000
Examples of the two default calibration points. The indicator will automatically order the list by increasing count values. The first point will show ***A 0***. The ***A*** stands for Applied load and the ***0*** for zero force. Access other existing points by using the ← or **MENU** key.

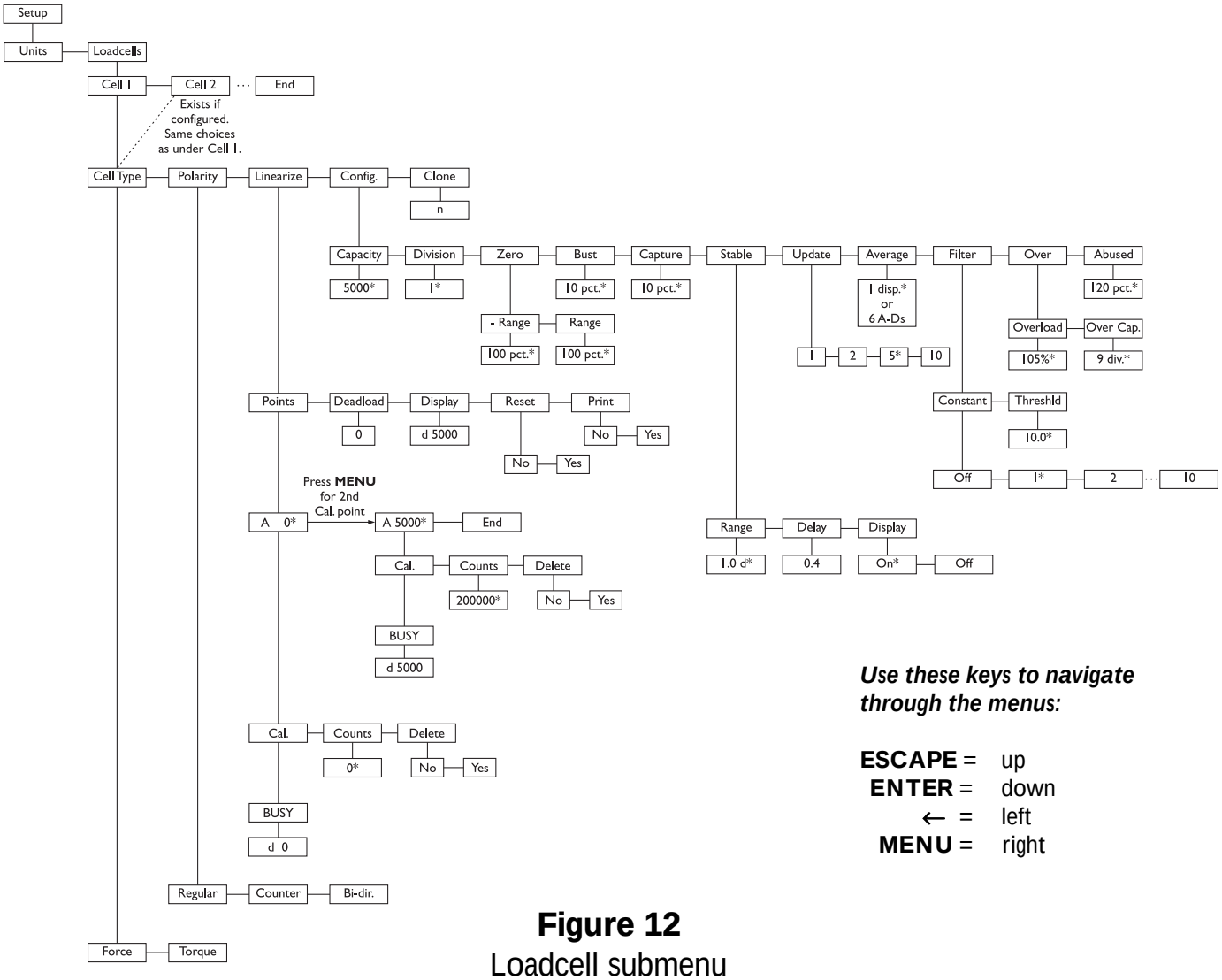
The FI-127 comes from the factory with two calibration points: 0 and 5000 lbs f. (These force values may differ depending on your unit of measure.)

Cal.
Counts
Points may be calibrated in two ways: 1) by standard force calibration or 2) by entering count values. Counts are calibrated to 5000 lbf at 1 mV/V signal from the factory. Existing points may be reviewed and modified via the keyboard.

Delete
You can delete a calibration point using this item.

Deadload Lets you view the count value for the current deadload. Press the **UNITS** key to change the display to mV/V.

Display Shows the weight display without having to exit the menus. An example of what is shown—***d 5000***. The ***d*** indicates a live display of weight and reminds you that the unit is in calibration. The value you see depends on the selected unit of measure, the calibration and the weight applied. The **UNITS** key works in this mode.



Use these keys to navigate through the menus:

ESCAPE = up
ENTER = down
← = left
MENU = right

Figure 12
Loadcell submenu

Reset Use this item to reset the calibration points to factory default values. If you choose ***yES*** the values are set to 0 lbs f at 0 mV/V and 5000 lbs f at 1 mV/V.

Print Lets you print the calibration values for a selected loadcell. See note at left. Choose from ***No*** or ***Yes***. If you choose ***Yes***, the information is output to port 1. Below is an example of the output format:

Printing the calibration values will allow both a record of your calibration and a means of restoring a calibration if the indicator fails or is damaged.

```
07-04-97   10:36 AM
Loadcell   1  T
    lbf        mV/V
--------   --------
  -20000   -0.20055
       0    0.00101
   10000    0.10203
   20000    0.20301
   30000    0.30512
   40000    0.40333
  100000    1.01234
Serial No.  _______
```

The T after Loadcell stands for tension. This string corresponds to the Cell Type.

Config. This submenu contains force measurement related parameters.

Capacity Use this to see or edit the capacity. The **UNITS** key works during this display. 5000 lb f is the default value.

Division This selection allows you to view and edit the division size of the enabled units of measure. You can enter any division size. The indicator will use the closest division size for each enabled unit of measure.

If you change capacity or division size in any unit of measure, this automatically changes all the other enabled units of measure as well.

If you want leading zeroes in your printouts or broadcast and autosend information, key in leading zeroes when setting division size.

You can view the division in other units of measure by pressing the **UNITS** key. The number is stored in the resolution you enter but is displayed in the closest valid division size. Any additional resolution is used in calculating division size in the other units of measure.

Zero Use this menu item to set zero related options. Zero range is specified as a percent of capacity referenced from the deadload. There are two items in the submenu: ***-Range*** and ***Range***.

-Range - Use this to set the negative range (below reference zero) within which the unit may be zeroed. 2% is the default value.

Range - Use this to set the positive range (above reference zero) within which the unit may be zeroed. 2% is the default value.

Bust Use this to enter a break percentage. Break percentage is the drop in force which the indicator will interpret as a break detection. This is entered as percentage of full capacity. 10% is the default value. The output signal is asserted when a break is detected and switches to the inactive state whenever you perform a zero or peak reset.

Capture Use this to enter a capture percentage. Capture percentage is drop in force occurring before a rebound in force to an ultimate peak of force. This capture percentage is given as a percentage of full capacity. See Figure 2 for an illustration.

Stable Use this menu item to set the motion detection parameters. There are three items in the submenu: ***Range***, ***Delay*** and ***Display***.

Range Use this to specify the number of ±divisions for the motion window. Default is 1.0 division.

Delay Use this to specify the number of seconds during which the weight must be within range (described above) before a no-motion condition is displayed. Default value is 0.4 seconds.

Display Choose ON to if you want the display on while the indicator senses scale motion. Choose OFF to blank the display while there is scale motion. Default is ON.

Update Use this to set the display update rate from these choices:

1 One update per second.

2 Two updates per second

5 Five updates per second

10 Ten updates per second.

Average Use this to configure the number of intervals to average for each force display. This can be entered in one of two methods: ***x disp.*** or ***x a-ds***. Press the **UNITS** key to switch back and forth between the two choices.

The suggested method of setting the average is by picking a value for ***x disp***. Doing this insures that a multiple of the display rate is always being averaged. This results in a steadier weight display.

Use ***x a-ds*** if you need an exact number of A-D conversions for your particular situation.

Changing the update rate changes the x disp. or x a-ds value based on the new update rate.

x disp. - ***1 disp.*** is the default display when you access this item. ***x*** is the number of display interval(s) over which the data is internally averaged prior to being displayed.

The number of A-Ds averaged is based on the display update rate you set under the ***Update*** menu item. Default is ***1 disp***.

x a-ds - ***x*** is the number of a-d conversions to average for each display.

The A-D weight conversion happens 60 times per second in this indicator. ***Average*** is the number of conversions you want to average for the weight that is displayed. Default is ***12 a-ds*** when ***Update*** is at default of 5 and ***x disp.*** is at default value of 1.

Harmonizer® filter is used only if the average value will not filter out the vibration by itself. See ***Tips on setting up and using the Harmonizer filtering*** *in Appendix C.*

Filter Use this menu item to configure the Harmonizer filter settings. ***Constant*** and ***Threshld*** are the two items you can configure in this submenu.

Constant - This number represents the amount of filtering. Choose a setting between 1 and 10. Choose 1 for the least amount of filtering but the fastest response. Choose 10 for the most filtering but the slowest response. Choose Off to disable the Harmonizer functions and default to the lowest filtering.

Throughout the calibration process values will change as you press the **UNITS** *key to change the unit of measure.*

Threshld - This is the window, in the current unit of measure, within which weight changes are altered according to the constant. ***0.0*** is the default value. You should set the threshold value between 130 and 150% of the total weight oscillations that need to be suppressed. If weight changes are +20 lbs and -10 lbs, set this value to 130 to 150% of 30 lbs.

When using overload or over capacity alone, set the other menu item to its maximum value to disable any conflicts.

Over This submenu lets you setup the overload and capacity setting which cause the ***O. load*** error message.

Overload - This value is expressed as a percent of capacity referenced from the deadload determined by calibration. Overload is restricted to 200% or lower. 105% is the default value.

Over Cap. - This value expressed as a number of divisions over the capacity referenced from the zero value. A value of 9 satisfies UK requirements. Configurable from 0 to 999999 divisions. Default is 9 divisions.

Abuse Use this to set the percent of capacity at which an abuse count will be incremented.

Clone Use this to initialize a the currently selected loadcell with the same values of another loadcell. Select the number loadcell you want to clone. If an invalid value for a loadcell is selected, **Error** is displayed.

Options submenu

The next Setup menu item is Options. Use this to configure the way your FI-127 works. Below is the entire menu structure located under this item. See the following pages for descriptions of these menu items.

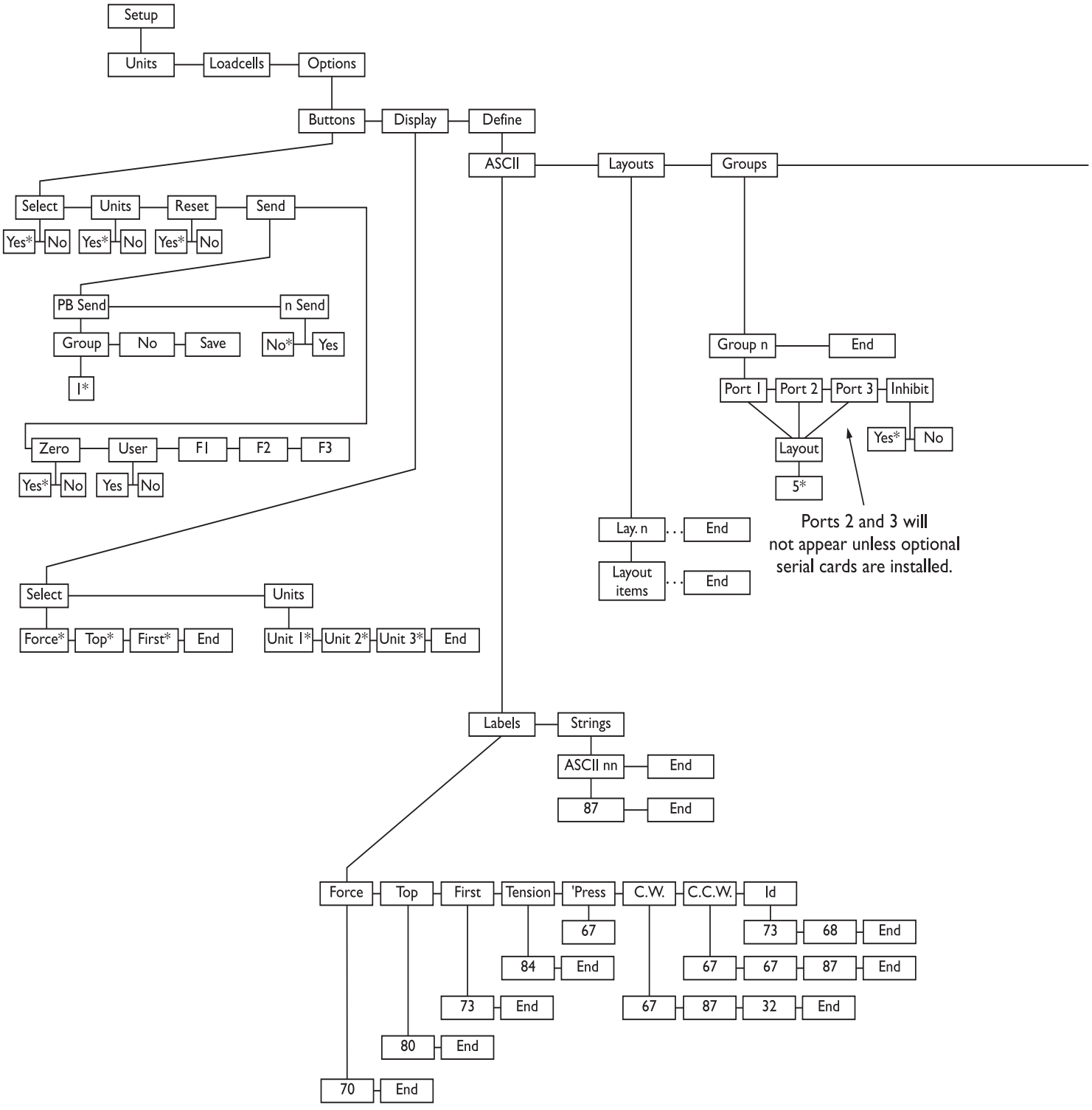
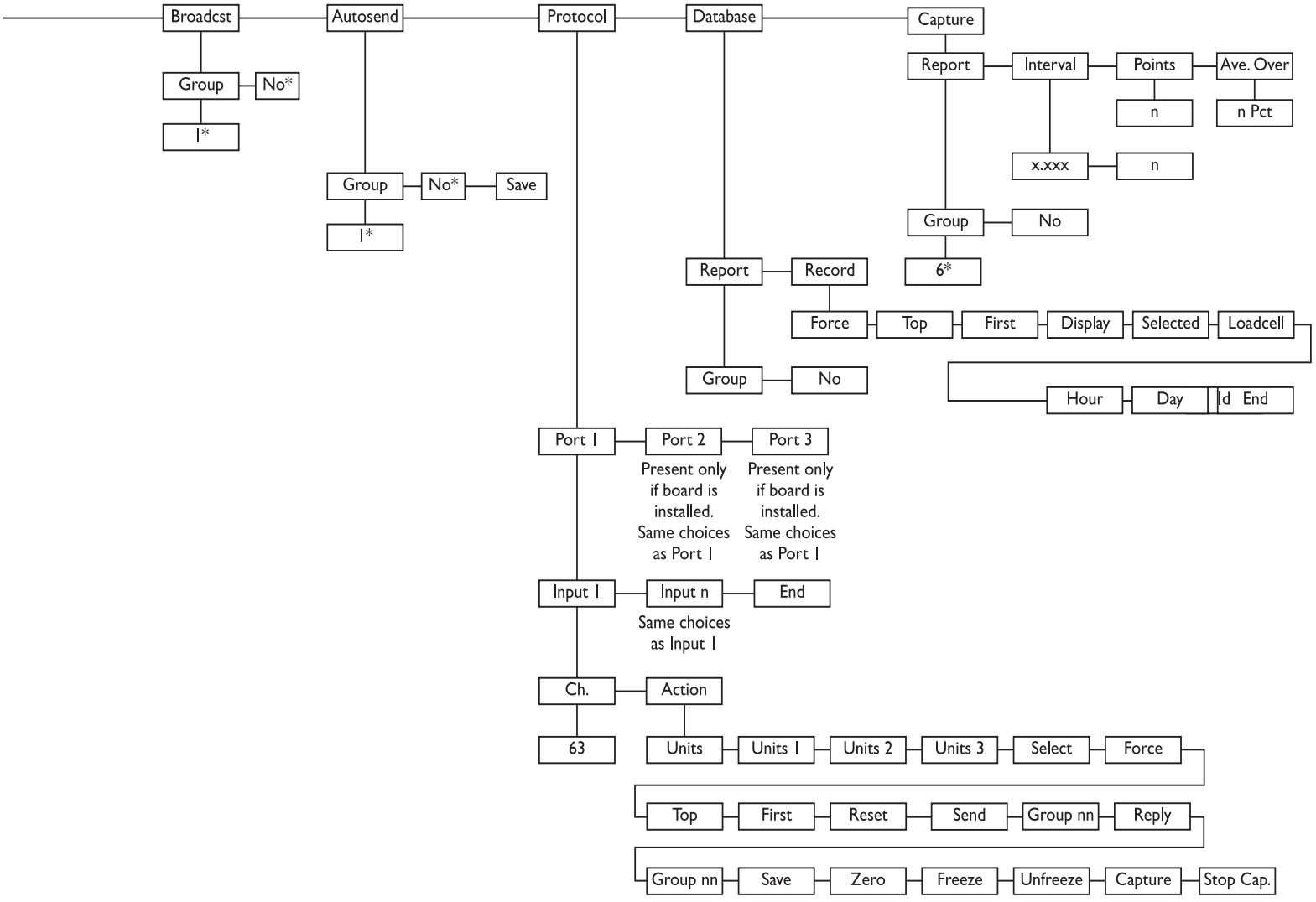


Figure 13
Options submenu


Broadcst
Group
No*
1*
Autosend
Group
No*
Save
1*
Protocol
Port 1
Port 2
Port 3
Present only if board is installed. Same choices as Port 1
Present only if board is installed. Same choices as Port 1
Input 1
Input n
End
Same choices as Input 1
Ch.
Action
63
Units
Units 1
Units 2
Units 3
Select
Force
Top
First
Reset
Send
Group nn
Reply
Group nn
Save
Zero
Freeze
Unfreeze
Capture
Stop Cap.
Database
Report
Record
Force
Top
First
Display
Selected
Loadcell
Hour
Day
Id End
Group
No
Capture
Report
Interval
Points
Ave. Over
n
n Pct
x.xxx
n
Group
No
6*

Buttons Use this to enable or disable the following front panel keys:

Select - Choose Yes or No to enable or disable the **SELECT** key.

Units - Choose Yes or No to enable or disable the **UNITS** key.

Reset - Choose Yes or No to enable or disable the **PEAK RESET** key.

Send - You have two items to configure in this submenu.

PB Send - Use this to determine which layouts are sent to which ports for pushbutton data send. You can choose a Group number to send a preconfigured layout, disable the pushbutton data send, or save the information to the database rather than outputting to the serial port. If you choose the Save option and the database is full, the display will show ***Full*** when you press the **DATA SEND** key.

n Send - Use this to enable or disable the ability to key in a group number then press the **DATA SEND** key to send that group data to a serial port.

Zero - Choose Yes or No to enable or disable the **ZERO** key.

Menu - Choose Yes or No to enable or disable the **MENU** key.

F1 - Choose Yes or No to enable or disable the **F1** key.

F2 - Choose Yes or No to enable or disable the **F2** key.

F3 - Choose Yes or No to enable or disable the **F3** key.

Display The Display submenu allows you to customize the order in which the FI-127 cycles through its weight display modes and units of measure.

Select Customize the list of weight display modes here. The default list is: Force→Top→Peak. Repeatedly pressing **SELECT** while in the Display mode will cycle through the list in that order. You may customize the list by inserting and/or deleting items in the list. The list can contain a maximum of four items.

To add an item: Determine where in the list you wish to insert an item. Display the item which will immediately follow the one you are inserting. Press ***+/-***. The ACCEPT annunciator illuminates. Cycle through the options by pressing the ← or **MENU** keys until the item you wish to insert is displayed, then press **ENTER**. That item is now included in the list.

To delete an item: With that item displayed, press **ZERO**. That item is deleted from the list.

Units Customize the list of units of measure here. The default list is: Unit 1→Unit 2→Unit 3. Repeatedly pressing **UNITS** while displaying a weight in the weight display mode will cycle through the list in that order. You may customize the list by inserting and/or deleting items in the list. The list can contain a maximum of four items.

To add an item: Determine where in the list you wish to insert an item. Display the item which will immediately follow the one you are inserting. Press **+/-**. The ACCEPT annunciator illuminates. Cycle through the options by pressing the ← or **MENU** keys until the item you wish to insert is displayed, then press **ENTER**. That item is now included in the list.

To delete an item: With that item displayed, press **ZERO**. That item is deleted from the list.

Define The Define submenu allows you to customize printouts, build ASCII strings, create groups, enable continuous send, assign input characters to specific actions for each port, enable database reports, define database records, and configure data capture.

ASCII Under this menu item are Labels and Strings. Following the explanation of these two items are instructions for customizing the labels and strings.

Labels are short ASCII strings predefined at the factory. When information is sent to a serial port and the layout calls for one of the preset labels, the associated ASCII string is sent. Following is a list of the label names and the character called out by the associated ASCII string:

Force = F
Top = P (for Peak)
First = I (for Initial)
Tension = T
'Press = C (for Compression)
C.W. = CW (for Clockwise)
C.C.W. = CCW (for Counter ClockWise)
Id = ID

Strings are groups of ASCII characters. You configure the indicator to call for these strings in the Layout portion of the menu. There are five predefined strings and ten other strings you can modify to suit your needs. The five default strings are:

Ascii 1: Dillon FI-127<cr><lf><End>
Ascii 2: Loadcell <End>
Ascii 3: Peak: <End>
Ascii 4: 1st Peak: <End>
Ascii 5: Average: <End>

Instructions for working with strings:

An ASCII character is any number between 0 and 255, inclusive. See Appendix A for a complete list of ASCII characters used with the FI-127. To repeat any ASCII character without entering it multiple times, enter the number then a decimal, then the number of repetitions you want. For example, an entry of 32.5 specifies that a space character is to be transmitted five times. If no decimal is entered, the indicator will send one character.

To insert a character at the end of the string, just press **ENTER** while the indicator displays ***End***. To insert a character before the current character, press the ***+/-*** key. To move back and forth along the string press the ← or **MENU** keys. To delete the current character press **ZERO**.

Layouts The FI-127 has 14 default print layouts (max. 15) (see *Appendix B: Default Layouts and Examples*). The display shows ***LAy. nn***, with ***nn*** being the identifying number of that layout.

Each layout consists of one or more of the print items in Table 1 below. Some items have a selectable variable. To see this variable, press the **ENTER** key twice while the item is displayed, key in a value or press the ← or **MENU** keys to scroll through a list. Press **ENTER** to accept the variable.

See the section *Step by Step Instructions* for some extra help.

** - denotes items that require detailed information. For example: if "LABEL" is inserted within a layout, you must specify the label to be printed; if "SP" is inserted, you must specify the number of spaces to be transmitted.*

Table 1: Layout Print Items

****ASCII***	Select an ASCII string number defined in the ASCII menu.
****Ch.***	Outputs an ASCII character you enter.
****Spaces***	Displayed as ***nn SP*** where ***nn*** is the number of spaces to be transmitted. (0 through 255)
****Crs***	Displayed as ***nn Cr.*** where ***nn*** is the number of carriage returns transmitted.
****LFS***	Displayed as ***nn LF*** where ***nn*** is the number of line feeds to be transmitted.
FF	Transmits a form feed control character.
Force	Transmits the Force value.
Top	Transmits the peak force.
First	Transmits the 1st peak value.
Display	Transmits the currently displayed force (force, peak, 1st peak, frozen force). This means that if a frozen force is displayed, that is what will be transmitted.
Selected	Transmits currently selected display. This means that if you have Force selected but a frozen force is displayed, the live force will be transmitted.

Hour	Transmits time in 12 hour or 24 hour format, depending on current setting.
Day	Transmits the date in mm/dd/yy format.
Status	Transmits the current status.
	Transmitted as a single character. The bits appear as follows: 011LEBM, where L is set to logic 1 when a Low voltage condition exists; logic 0 otherwise. E is set to 1 when an a-d Error condition exists; 0 otherwise. B is 1 when the measurement is Beyond displayable range (over- or under-capacity); 0 otherwise. And M is set to logic 1 when an in-motion condition exists; set to logic 0 when the measurement is stable. The upper four bits are set to 0011 to cause the value to be printed as a digit or symbol in row 3 of the ASCII character set.
****Label***	Transmits the chosen label. Choose from Force, Top, First, Display and Id.
Units	Transmits the unit of measure label.
Loadcell	Outputs the currently selected loadcell number.
Cell Type	Outputs the label for the type of loadcell; tension, compression, clockwise, counterclockwise and mode for bidirectional cells.
****Layout***	Allows you to embed another layout within the current layout. Displayed as ***Use n***. Choose the layout number, ***n***, you want to print as part of the current layout.
****Delay***	Use this to specify a time delay in seconds from 0-255.
Record	Transmits the currently selected record number.
Db. Force	Transmits the force value stored in the currently selected database record.
Db. Top	Transmits the peak value stored in the currently selected database record.
Db. First	Transmits the 1st peak value stored in the currently selected database record.
Db. Disp.	Transmits the displayed value stored in the currently selected database record.
Db. Sel.	Transmits the selected value stored in the currently selected database record.
Db. Label	Transmits the Force, Peak, or 1st Peak label stored in the currently selected database record.
Db. Cell	Transmits the loadcell number stored in the currently selected database record.
Db. Type	Transmits the cell type label stored in the currently selected database record.
Db. Units	Transmits the unit of measure stored in the currently selected

** - denotes items that require detailed information. For example: if "LABEL" is inserted within a layout, you must specify the label to be printed; if "SP" is inserted, you must specify the number of spaces to be transmitted.*

	database record.
Db. Id	Transmits the Id value stored in the currently selected database record.
Db. Hour	Transmits the time stored in the currently selected database record.
Db. Day	Transmits the date stored in the currently selected database record.
nn by DB.	Specifies that Layout nn is to be used once for every record in the database, in ascending order. This allows you to generate database reports. As Layout nn is used for each record, that record is considered to be the currently selected record for the purpose of serial output. The actual current record is not modified by the generation of a report.
Point -	Transmits the currently selected data capture point. If no points exist, blanks are output. During data capture, no points are considered to exist.
D.C. Force	Transmits the force value of the currently selected data point.
D.C. Top	Transmits the peak value of the currently selected data point.
D.C. First	Transmits the 1st peak value of the currently selected data point.
D.C. Ave.	Transmits the mean value of the stored points.
D.C. Int.	Transmits the data capture interval in ***nnnn*** format, right justified with leading zero suppression.
D.C. Hour	Transmits the data capture start time.
D.C. Day	Transmits the data capture start date.
nn By D.C.	Specifies that Layout nn is to be used for every point captured, in ascending order. This allows you to generate data capture reports.
End	Specifies the end of the layout. Does not transmit anything.

* denotes items that require detailed information. For example: if "LABEL" is inserted within a layout, you must specify the label to be printed; if "SP" is inserted, you must specify the number of spaces to be transmitted.

Groups A group defines which ports will print which layouts. A total of nine groups is available. Six are set up with defaults. See the list below. Within each group, up to three ports can output layouts. Port 1 is standard; ports 2 & 3 are offered only if additional serial boards are installed. Each port is then assigned a layout to print.

You can also choose to inhibit the output while a motion condition or other invalid condition exists. Choose ***Yes*** to inhibit output and ***No*** to allow output during motion.

Default Groups				
Group #	**Port 1**	**Port 2**	**Port 3**	**Inhibit**
1	Layout 5	None	None	Yes
2	Layout 6	None	None	Yes
3	Layout 7	None	None	Yes
4	Layout 8	None	None	Yes
5	Layout 10	None	None	No
6	Layout 14	None	None	No

Broadcast Enables or disables continuous send. To enable continuous send, a group number must be entered under ***GrouP***. This number defines the group to be activated at each display update.

Autosend Enables or disables autosend. To enable auto send, a group number must be entered under ***GrouP***. This number defines the group to be printed each time weight stabilizes above 1% capacity. The weight must fall below 1% capacity for the indicator to initiate another print. Choose Save so information is saved in the database rather than outputting to the serial port. If the database is full, the data cannot be stored and the autosend trigger is ignored.

Protocol A protocol is defined as the set of input characters assigned to specific actions for each port. Under this item you choose a port, choose an input number, assign an ASCII character to the action, and choose the associated action from the following list (see note at left):

*Except for **Reply** and **Save**, the actions at right can only be executed if the character is received while the indicator is in the Display mode. **Reply** and **Save** can be executed when the indicator is in Display mode and also in the User Menu.*

- ***Units*** - Switches indicator to the next available unit of measure.
- ***Unit*** 1 - Switches indicator to Unit 1, if available.
- ***Unit*** 2 - Switches indicator to Unit 2, if available.
- ***Unit*** 3 - Switches indicator to Unit 3, if available.
- ***Select*** - Switches indicator to next available display mode.
- ***Force*** - Switches display to the Force mode.
- ***Top*** - Switches display to the Peak mode.
- ***First*** - Switches display to the 1st Peak mode.
- ***Reset*** - Causes a Peak Reset.
- ***Send*** - Causes a Data Send to occur. Use ***Group*** to specify which group to output.
- ***Reply*** - Specifies that a specified group is to be output. Use ***Group*** to specify which group to output.
- ***Save*** - Causes information selected by the record definition is to be stored in the database. If the database is full this command is ignored.
- ***Zero*** - Performs a Zero function.

Freeze - Causes the Force display to be frozen. See the section *Freeze Force Function*.

Unfreeze- Causes a frozen force to be unfrozen. See the section *Freeze Force Function*

Capture - Starts the data capture process.

Database - Use this item to enable or disable database report output and specify which group to use. Choose a group number under ***Report*** to enable the function and choose ***No*** to disable it.

Under ***Record***, you define the database record format. Any of the following items can be included in any order but only once. If one of the force measurement items is included, the unit of measure, identification (force, peak, 1st peak), and tension/compression are also saved for that record within the database.

Force - Force measurement

Top - Peak value

First - 1st peak

Display - Force, Frozen force, Peak or 1st Peak, depending on display mode.

Selected - Force, Peak or 1st Peak, depending on display mode.

Loadcell - Currently selected loadcell number.

Id - Id value.

Hour - Current time.

Day - Current date.

End - End of the list. Insertions and deletions may be performed with the ***+/-*** and **ZERO** keys anywhere within this list.

See detailed notes on data capture in the section Data Capture *later in this manual*

Capture - This is the last item in the Define submenu. Use this item to configure data capture.

Under ***Report***, enable the data capture function by choosing which group to use. Disable it by choosing ***No***.

Under ***Interval***, set the time, in seconds, between captured points. If you set a value of 0, the data capture function is disabled.

Under ***Points***, set the number of data points to be captured. Can be 0-4000. Entering 0 disables data capture. Default value is 3600 which is equal to one minute of data if capture rate is 60 Hz.

Under Ave. Over, set the data capture threshold for computing the average. The value is expressed as a percent of full capacity referenced from the current zero balance. 10% is the default setting. Can be as high as 100%.

Serial submenu

The next setup menu item is Serial. See Figure 14. Use this configure your serial communications.

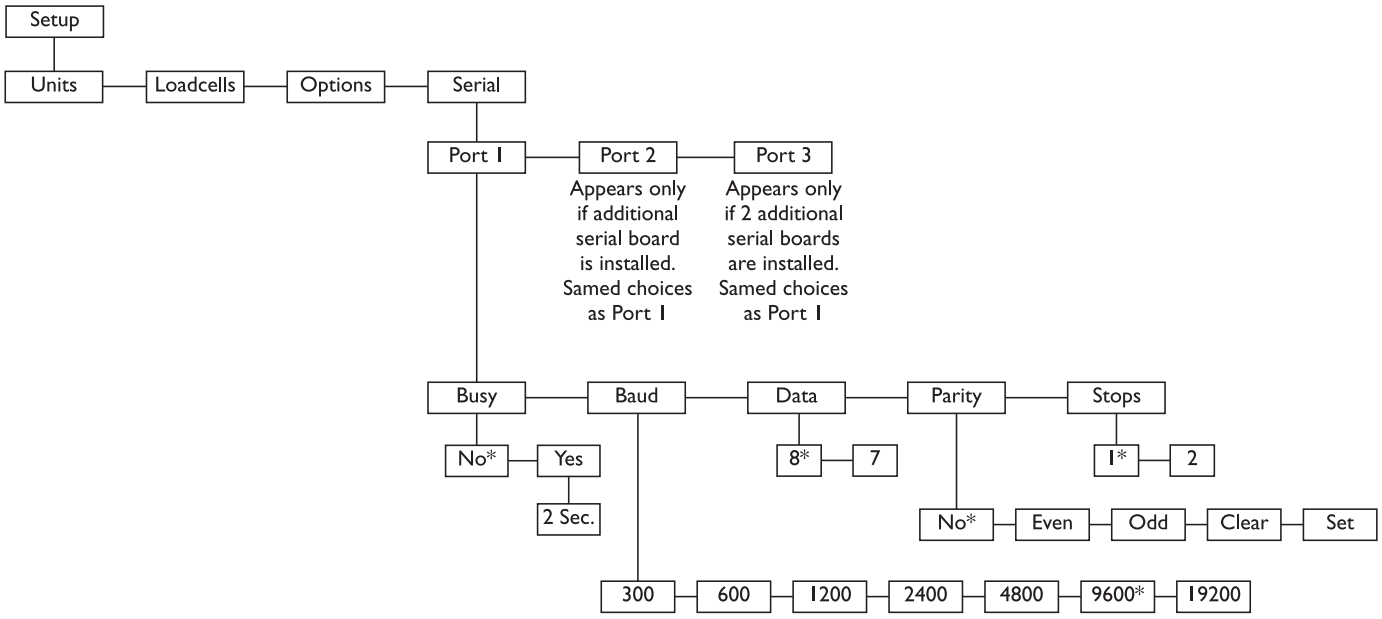


Figure 14
Serial submenu

Choose which port you are going to configure. The choices for all three ports are the same as those shown in the Figure 14 under Port 1.

Port n - Under ***Busy***, select whether ready/busy input is respected. Choose ***No*** to disable ready/busy input. Choose ***Yes*** to enable ready/busy input. If you choose Yes, you may enter a busy time-out period. This sets how long a port can be busy before the indicator displays a port busy message.

Baud - Select the baud rate from these choices: ***300, 600, 1200, 2400, 4800, 9600, 19200***

Data - Set the number of data bits: ***7*** or ***8***

Parity - Set the parity. ***No*** is default. Other choices are ***Even***, ***Odd***, ***Clear*** and ***Set***.

Stops - Select the number of stop bits: ***1*** or ***2***.

B.C.D Out submenu

The B.C.D. Out submenu, shown in Figure 15, is next under Setup. Use this configure whether the BCD board outputs force information. This item is only offered in the Setup menu if the BCD board is installed.

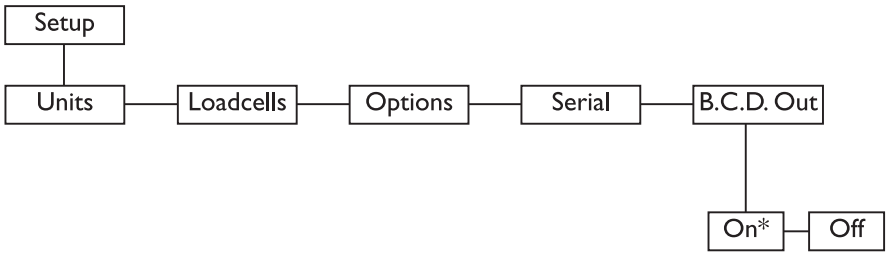


Figure 15
B.C.D. Out submenu

Analog submenu

The Analog submenu is shown in Figure 16 and explained below.

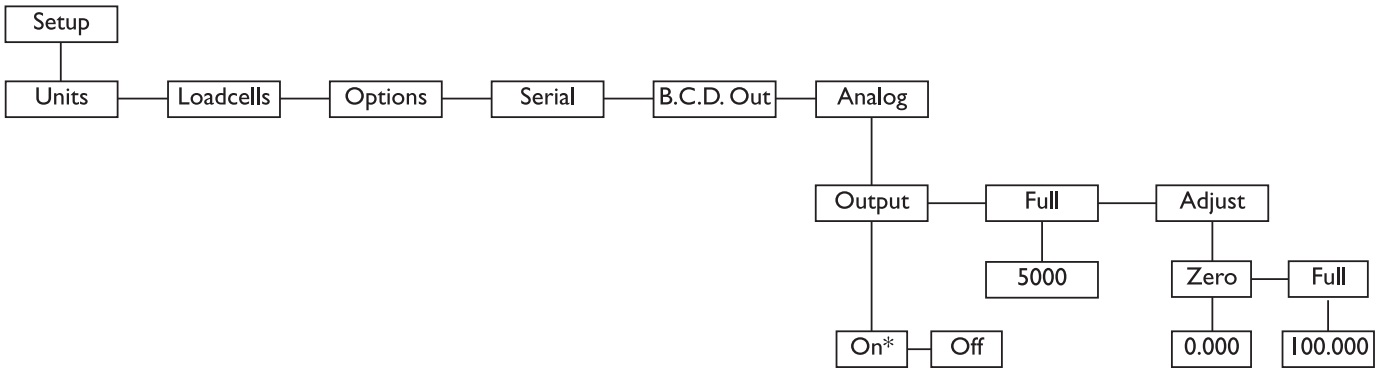


Figure 16
Analog submenu

Output - Under Output, choose ***On*** to output the force value and ***Off*** to disable analog output. The optional Analog output board must be present for this function to work.

Full - Allows you to view/edit the value to which the analog output may be spanned. This selection is not offered when **Output** is set to ***Off***.

Adjust - Provides access to the offset and gain adjustments for the analog output. The adjustment can be made by entering a percent value or by using ← or **MENU** to make incremental adjustments. Pressing ← decreases the adjustment; pressing **MENU** increases it. Holding in ← or **MENU** causes the magnitude of the adjustment to double every key repeat (2/sec) until it reaches 512 times the minimum adjustment. The adjustment magnitude is maintained in the same direction on every key press, until the other

direction key is pressed, which cuts the magnitude by 4. Minimum adjustments are by approximately. 0.002 and each setting can be adjusted over a range of +/-10% of full output. This selection is not offered when **Analog Output** is set to ***Off***.

Under ***Zero*** you can adjust the voltage/current output for a zero force reading. 0.000 is the nominal value.

Under ***Full***, you can adjust the voltage/current output for full capacity. 100.000 is the nominal value.

Ouputs submenu

Use the output submenu, shown in Figure 17, to control the rate and information associated with the control outputs. All comparisons are based on the measured force.

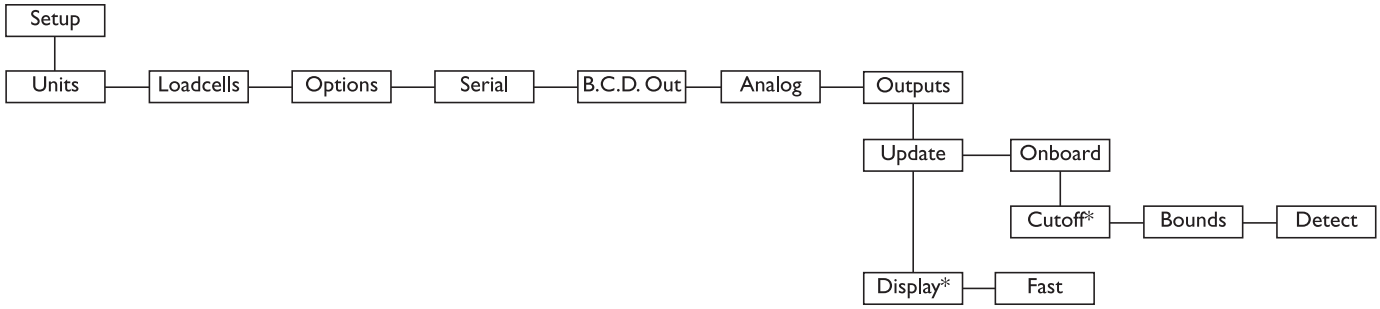


Figure 17
Outputs submenu

Update - Select how often the cutoffs are updated. Choose ***Display***, the default choice, to update the cutoffs at each display update. Choose ***Fast*** to update 20 times per second.

Onboard - Lets you choose the function of the onboard outputs (1-3 on the main board). Choose ***Cutoff***, the default choice, to cause the outputs to be the same as the cutoffs 1-3. Choose ***Bounds*** to cause the outputs to follow the Under/Accept/Over LEDs on the front panel. Choose ***Detect*** to cause the outputs 1 and 3 to follow the Under and Over annunciators respectively but associates output 2 with Break Detect.

Inputs submenu

Use the inputs submenu, shown in Figure 18, to assign actions to the onboard hardware inputs. See the table below for the default assignments.

Inputs—Onboard default assignments	
Input	**Action**
1	Remote Zero Key
2	Remote Print Key
3	Go to Force Display Mode
4	Go to Peak Display Mode
5	Remote (pushbutton) Peak Reset Key
6	Freeze Reading Input (see section 16)
7	Remote Units Key

Input 1-7 - All the actions available under ***Options/Define/Protocol/ Port n/Input n/Ch./Action*** are also available under these items.

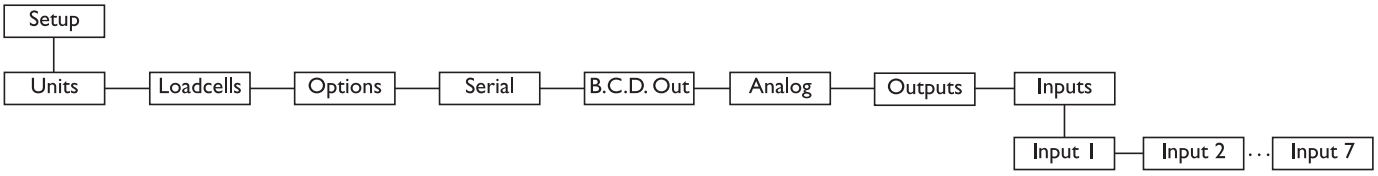


Figure 18
Inputs submenu

Seal submenu

The last item in the FI-127 Setup menu is Seal. Use this submenu to set up a custom password and to set the sealing choices for the unit. The Seal submenu is shown below.

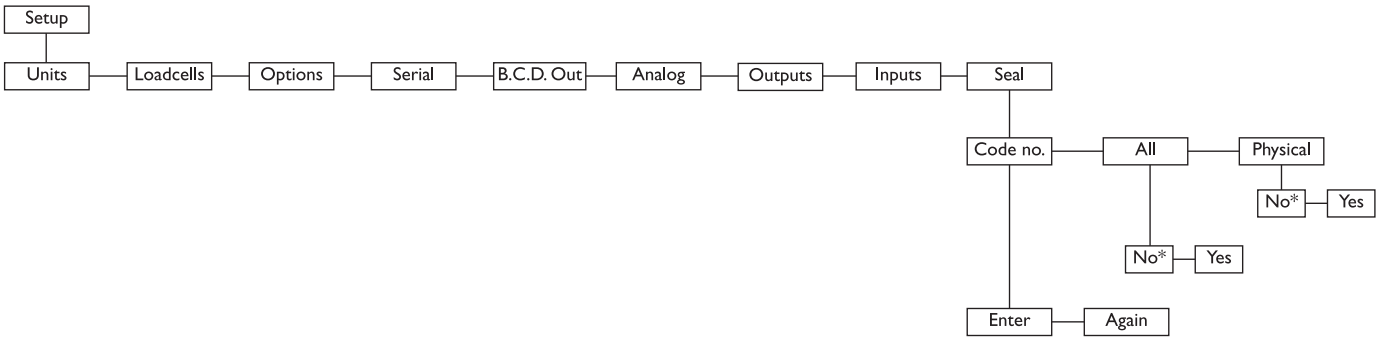


Figure 19
Seal submenu

Items in the Setup menu (Figure 10) can be protected from unrecorded changes.

Two internal counters record changes to items in the Setup menu. View these counters under ***AUDIT*** in the Service menu (Figure 6). These counters cannot be reset and thus can be used by auditors or inspectors to check if changes have been made. One counter is for scale calibration items and the other for configuration items. The level of protection is set in the Seal submenu.

Code No. This item allows you to enter a personalized security code number. Digits are not shown on the display as you key them in, so the display prompts you to enter the code number twice.

All & ***Phys.*** The two parameters in the ***SEAL*** menu are ***All*** and ***Phys***. Below are explanations of the choices you can make.

All set to ***Yes -*** Any time you access the setup menu and change any item in Table 2, the appropriate counter increments one count. Changing multiple items on one visit to the menu increments the counter only one count. It's the number of visits with changes that are counted, not the number of changes per visit.

All set to ***No -*** With this setting the calibration internal counter will increment when you access the setup menu and change any calibration item in Table 2. The internal configuration counter will increment only if you change one of the configuration items in **bold** print from Table 2.

*If **Phys.** is set to **No**, you can still press the internal switch and have instant setup menu access and editing privileges.*

Phys. set to ***Yes -*** If ***Phys.*** is set to ***Yes***, you must remove the physical seal (rear sealing plug) of the FI-127 to access an internal switch. When you press this switch you have full editing privileges and the display shows the first item in the Service menu, ***About***, without the need to enter the password.

If you enter the Service menu using the password and not the internal switch, you can change only the configuration items in Table 2 that are in normal, not **bold**, print.

Phys. set to ***No -*** If ***Phys.*** is set to ***no***, correct password entry is the only way to have editing privileges of all the items in Table 2 without breaking the physical seal. See note to left.

If the password is not entered correctly, the setup menu items can be viewed but not edited.

Calibration Items	Configuration Items
Any item in the Linearize menu	**Any item in the Loadcells menu**
	Any item in the Options menu
	Any item in the Seal menu
	Any item in the Serial menu
	Any item in the B.C.D. Out menu
	Any item in the Analog menu
	Any item in the Outputs menu
	Any item in the Inputs menu

Table 2
Calibration and Configuration list

This is the end of the Service Menu and all its components.

Reset Menu / Master Clear

User Master Clear as a last resort before sending in the unit for repair.

You must press the Seal switch if the unit is physically sealed.

The reset menu may not contain all the items shown in Figure 20. If an item is at default and not corrupted it will not appear in the menu.

Corrupted items will flash. Items not at default and not corrupted will appear but will be solid (not flashing). These items are not required to be reset.

*If the **SEAL PHYS.** selection is corrupted, the unit assumes that the selection is **YES**.*

*A software change **requires** a reset. You must press the seal switch to force the reset to occur properly.*

The reset menu shown in Figure 20 appears in two cases.

1. If you do a Master Clear (powering up the unit with both the **MENU** and **F2** keys pressed).
2. If setup, calibration, or data becomes corrupted.

In case 1, you will need to enter the password the same way as explained in the Service menu. After correctly entering, the reset menu will be displayed.

1. With ***Reset*** displayed, press the **ENTER** key. . .

   The first menu item will be displayed. See note at left.

2. Press the **ENTER** key. . .

   No is displayed.

3. Choose ***Yes**** to reset to default values or ***No*** to leave the values as they are. Toggle between the choices with the ← or **MENU** key. When the choice you want is displayed, press the **ENTER** key. . .

   ***** If the unit is physically sealed, you must press the internal switch to select **YES.***

   If you reset the item, the display will show the next item. When you reset an item to defaults it disappears from the menu.

4. Repeat steps 2 and 3 for each item in the menu. . .

   When all items are either accepted or reset the indicator reboots automatically.

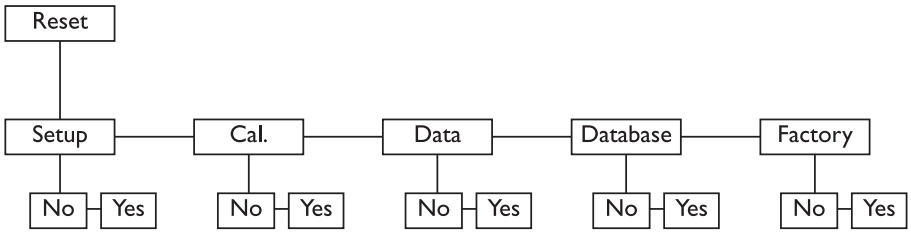


Figure 20
Reset menu

In case 2, the display bypasses the password and goes right to ***Reset***. Repeat steps 1 through 4 above.

Adding and Calibrating a Loadcell

Adding a Loadcell

Be sure you perform the procedure described at right only on a cell you really want to change.

Print or record your existing calibration as described on page 24. This will preserve these values for future re-entry if necessary.

This section is meant to guide you through the process of connecting a second loadcell to your indicator and configuring the loadcell for use in your application.

To connect a second loadcell, disconnect the first and connect the 7-pin connector from the second to the indicator at the same spot. You need to configure the FI-127 to use this loadcell correctly by assigning a cell number to it, defining what type of loadcell it is and several other parameters. Refer to the loadcell menu shown in Figure 12 while going through the following instructions. These instructions assume the unit is not sealed.

1. From Display mode, key in '127' and press and hold the **ESCAPE** key. . .	***About*** is displayed.
2. Repeatedly press the **MENU** key until ***SEtUP*** is displayed, then press the **ENTER** key. . .	**Units** is displayed.
3. Press the **MENU** key. . .	***LOACEllS*** is displayed.
4. Press the **ENTER** key. . .	***Cell 1*** is displayed in this example. If you press the MENU key, you will see the current list of loadcells shows just ***Cell 1*** and ***End***.

This is the point at which you assign your new loadcell a number. For this example we'll use Cell 2. You need to insert this cell number into the list.

5. With ***End*** displayed, press the ***+/-*** key.	***Cell 2*** is displayed showing that a new cell has been added to the list.

You now need to define what kind of cell this is.

6. Press the **ENTER** key. . .	***CEll tYPE*** is displayed.

If you look at Figure 12 you will see that the other items in the list with Cell Type are Polarity, Linearize, Config. and Clone.

7. Press the **ENTER** key. . .	***torquE*** or ***FOrCE*** is displayed.

To exit back to Display mode, press the **SELECT** *key and save changes as needed by pressing* **ENTER** *or* **SELECT** *with* ***SAVE****? displayed.*

To exit without saving changes, press ← *or* ***MENU*** *until* ***No Save*** *appears then press* **ENTER** *or* **SELECT**.

8. Use the **MENU** key to toggle between these two choices. If you are connecting a torque loadcell, have ***torquE*** displayed when your press **ENTER**. If you are connecting a force loadcell, have ***FOrCE*** displayed when you press the **ENTER** key. . .

CEll tYPE is displayed. The cell type is now set and you can move on to the next item in the list, Polarity.

Now that you have the hang of getting around in this menu and setting the parameters, use the same method to set the polarity of your loadcell. After polarity comes Linearization. This important process is explained in detail in the next section.

Calibrating a Loadcell

This section gives you more detailed instructions on calibrating your loadcell. Calibration is part of the menu titled ***linEAriZE***. Refer to Figure 12 as you work through this section.

Overview

Linearization is the process of making the indicator display the correct force along the entire range of the loadcell's capacity. To linearize a loadcell you associate a specific force to a specific point on a line of increasing force. See Figure 21.

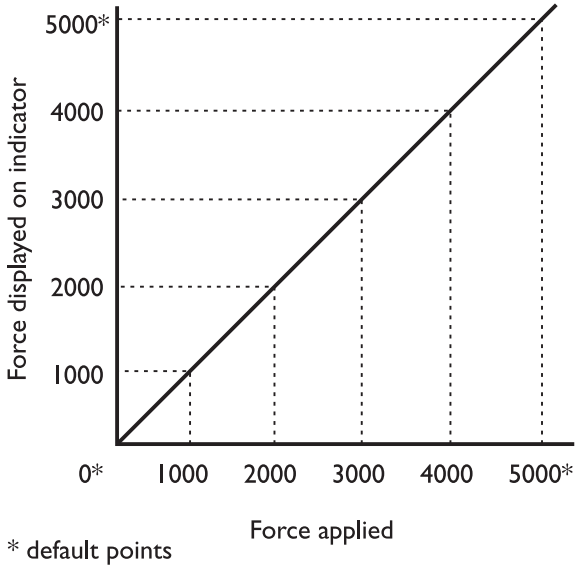


Figure 21
Linearization illustration

The Linearize menu provides you with two existing test points, 0 and 5000. You can insert up to eight more test points for a total of ten. In the following step by step instructions you will apply the appropriate test force for each test point and press **ENTER** to assign the applied force to that point. You will repeat this until all points are calibrated.

Step by Step

The steps below use the defaults shown in Figure 12. Your system may be configured differently and will look different than this specific example, but this should give you the idea of how the process works so you can use it to configure your indicator.

1. With ***linEAriZE*** displayed, press the **ENTER** key. . .	***PointS*** is displayed.
2. Press **ENTER**. . .	***A 0*** is displayed. This is the zero calibration point.

You can calibrate this point now or add/delete points. Steps three through five show how to add a test point and steps 6 through 9 show how to calibrate a point.

Adding or deleting a test point:

3. With ***A 0*** displayed, press **MENU** to see the other existing test point. . .	***A 5000*** is displayed. This is the second default test point.
4. With any test point displayed, press **ZERO** key to delete the point. . .	The next point in the list is displayed.
or press the ***+/-*** key to insert a point. . .	***A _*** is displayed.
5. Key in the value for the new test point and press **ENTER**. . .	***CAL.*** is displayed. Continue to the next step to calibrate or press **ESCAPE** to go back to the point display.

As you add points, the list is placed in numerical order automatically by the indicator.

Calibrating a point:

6. With the test point you want to calibrate displayed, press **ENTER**. . .	***CAL.*** is displayed. You can calibrate this point using step 7 or press the **MENU** key to enter a specific count value. This is an alternate method of calibrating

points.

From the factory 0 counts = 0 force and 1 mV/V = 5000 lbs force.

7. Apply the test force for this point to the loadcell and press **ENTER** to calibrate this point. . .

bUSY is displayed while obtaining a stable value. Pressing **ENTER** while ***bUSY*** is displayed causes the current average to be taken immediately instead of waiting for a stable value. Pressing any other key while ***bUSY*** is displayed will abort the calibration step being performed and the display returns to the previous display.

When a stable value is obtained ***d n*** is displayed. This is a live display of force. The ***d*** is to remind you that this is not the normal display mode and the ***n*** is the force on the loadcell.

8. Press **ENTER** to return to the point display.

This point is now calibrated.

9. Repeat steps 6-8 for all the points you want to calibrate.

Remember, you must press the **MENU** key to move to the second calibration point. ***A 5000*** is the default.

To exit back to Display mode, press the **SELECT** *key and save changes as needed by pressing* **ENTER** *or* **SELECT** *with* ***SAVE****? displayed.*

To exit without saving changes, press ← *or* ***MENU*** *until* ***No Save*** *appears then press* **ENTER** *or* **SELECT**.

Finish setting up your loadcell by completing the ***CONFIG.*** and ***CLONE*** parts of the menu shown in Figure 12. Use *Clone* to configure a loadcell identically to an existing loadcell. Just enter the correct loadcell number you want to clone.

After you complete these selections your loadcell will now be remembered as Cell 2. You can now switch back and forth between the two loadcells by connecting the one you want to the indicator and selecting Cell 1 or Cell 2 using the **F1** key.

Step by Step Instructions

This section contains step by step examples of some of the procedures you use to configure your indicator. It is not meant to cover every item but to cover the general procedures for moving, selecting, changing, etc.

Strings

Below are examples of viewing, creating and editing strings.

Viewing strings

1.	With ***StringS*** displayed, press **ENTER**. . .	***ASCII 01*** (default string) is displayed.
2.	Press **ENTER**. . .	The first ASCII value in the string is displayed.
3.	Press ← or **MENU** to scroll through the entire string of ASCII values.	
4.	When you are finished viewing the values, press **ESCAPE**. . .	***ASCII 01*** is displayed.
5.	Press **MENU**. . .	On a new indicator, ***End*** is displayed. This means that there is only one ASCII string (ASCII 01) defined so far. You may create up to fifteen more.

Creating new strings

1.	With ***StringS*** displayed, press **ENTER**. . .	***ASCII 01*** (string #1) is displayed.
2.	Press **MENU** until . . .	***End*** is displayed.
3.	Press **+/-** . . .	The next ASCII string in the list will be added. On a new indicator, this will be ASCII 02.
4.	With the new ASCII string displayed, press **ENTER**. . .	***End*** is displayed. This means that there are no ASCII values entered for this string.
5.	Press **+/-**. . .	**—** is displayed.
6.	Key in your first ASCII value, then press **MENU**. . .	The value is stored and ***End*** is displayed.

To delete the displayed ASCII value press the **ZERO** *key. ASCII value 1.0 is an error and should be deleted from your string.*

7. Continue repeating steps 5 & 6 until you have entered all your ASCII values. If you make an error, refer to the next section: *Editing strings*.

8. To view your newly entered ASCII values, press **MENU** repeatedly. . . — The indicator scrolls through all the values.

Editing strings

There are two keys to remember when inserting or deleting ASCII values in a string: ***+/-*** will insert and **ZERO** will delete. We will use the following example to illustrate how to edit strings: remove and then replace the hyphen from the default string ASCII 01: Dillon FI-127.

1. With ***StringS*** displayed, press **ENTER**. . . — ***ASCII 01*** is displayed.

2. Press **ENTER**. . . — ***65***, the first ASCII value in the string, is displayed.

3. Press ← and **MENU** to scroll through the entire string of ASCII values. Stop when the ASCII value you want to delete (in this case, ***45***-hyphen) is displayed. . . — ***45*** is displayed.

4. With ***45*** displayed, press **ZERO**. . . — The hyphen character is deleted and the next value--***49***--is displayed.

5. To insert a character, scroll through the ASCII string until the value that the character will precede is displayed. . . — ***49*** is displayed.

6. Press ***+/-*** . . . — __ is displayed.

7. Key in your ASCII value, then press **ENTER** . . . — The character is inserted in the string and the string name (ASCII 01) is displayed.

Layouts

It is within the Layouts submenu that you create/customize the layouts which will be transmitted to the serial port.

Viewing layouts

1. With ***LAYOutS*** displayed, press **ENTER**. . .	***LAY. 01*** (the first default layout) is displayed.
2. Press **ENTER**. . .	The first item in the layout is displayed.
3. Press ← and **MENU** to scroll through the entire layout.	
4. When you are finished viewing the items, press **ESCAPE**. . .	***LAY. 01*** is displayed.
5. Press **MENU**. . .	***LAY. 02*** is displayed. On a new indicator, the fourteen default layouts are present. You may create one more.
6. Repeat steps 1-5 above to view all the layouts.	

Creating new layouts

1. With ***LAYOutS*** displayed, press **ENTER**. . .	***LAY. 01*** (string #1) is displayed.
2. Press **MENU** until . . .	***End*** is displayed.
3. Press ***+/-*** . . .	The next layout in the list will be added. On a new indicator, this will be LAY. 15.
4. With the new layout displayed, press **ENTER**. . .	***End*** is displayed. This means that there are no items entered for this layout.
5. Press ***+/-***. . .	***ForcE*** is displayed and the ACCEPT annunciator illuminates indicating that you are selecting items.

6. Scroll through the list of available layout items (see Table 1) by pressing the **MENU** key. When the block you wish to insert in the layout is displayed, press **ENTER**. . .

The ACCEPT annunciator goes off and that item is displayed. Some items (the ones with asterisks in Table 1) require that additional information be entered after selecting the item. For example, if you choose ***LF***, you must next enter a value for the number of line feeds you want, then press **ENTER** once again.

7. Continue repeating steps 5 & 6 until you have entered all your layout items. If you make an error, refer to the next section: *Editing Layouts*.

8. To view your newly entered layout, press **MENU** repeatedly. . .

The indicator scrolls through all the layout items.

Editing layouts

There are two keys to remember when inserting or deleting items in a layout: **+/-** will insert and **ZERO** will delete. We will use the following example to illustrate how to edit layouts: remove and then replace the line feed from default layout 01.

1. With ***LAYoutS*** displayed, press **ENTER**. . .

LAY. 01 is displayed.

2. Press **ENTER**. . .

LAbEL, the first item in the layout is displayed.

To delete any displayed block, press the **ZERO** *key.*

3. Press **MENU** to scroll through the layout. Stop when the item you want to delete--***1 LF*** (one line feed)--is displayed. . .

1 LF is displayed.

4. With ***1 LF*** displayed, press **ZERO**. . .

The item is deleted and the next item--in this case, ***End***--is displayed.

5. To insert an item in a layout, you must display the item it will precede. In this example, we will insert a line feed in front of ***End***. . .

End is displayed.

6. Press **+/-** . . .	***ForcE*** is displayed and the ACCEPT annunciator illuminates indicating that you are selecting items.
7. Scroll through the list of available layout items by pressing the **MENU** key until ***LFS*** is displayed. . .	***LFS*** is displayed.
8. Press **ENTER**. . .	***0*** is displayed.
9. Key in the number of line feeds you want, 1 for this example, and press **ENTER**. . .	***1 LF*** is displayed.
10. Press **ESCAPE** to return to. . .	***LAY. 01***

Groups

The Groups submenu is where you specify which ports will print which layouts.

A total of nine groups is available. There are six that are predefined. Within each group, up to three ports can output layouts. Port one is standard; **ports 2 & 3 are offered only if additional serial boards are installed**. Each port is then assigned a layout to print. Here are two examples of how the groups might be set up:

Group 1:	Port 1 prints Layout 1	Group 2:	Port 1 prints Layout 5
	Port 2 prints Layout 2		Port 2 prints nothing
	Port 3 prints Layout 3		Port 3 prints Layout 2

*The default for the **PRINT** key is Group 2.*

*You may print other groups by keying in the correct group number, then pressing **PRINT**. Note: This option must be enabled in the service menu first.*

The default group settings are:

Group #	Port 1	Port 2	Port 3
1	Layout 5	None	None
2	Layout 6	None	None
3	Layout 7	None	None
4	Layout 8	None	None
5	Layout 10	None	None
6	Layout 14	None	None

Follow the instructions below to set up your groups.

1. With ***GrouPS*** displayed, press **ENTER**. . .	***GrouP 1*** is displayed.
2. Press **MENU** to scroll through the list of available groups. To insert a new group, with ***End*** displayed, press **+/-**. A total of nine groups is available. When the group you wish to define is displayed, press **ENTER**. . .	***Port 1*** is displayed.

3.	Press **ENTER**. . .	***LAYOut*** is displayed.
4.	a. If you **do not** want to print from this port, press **MENU** . . .	***NONE*** is displayed.
	b. If you **do** want to print from this port, press **ENTER**, then key in the correct layout number. . .	***nn**** (layout number) is displayed.
5.	Press **ENTER**. . .	***Port 1*** is displayed. (If you are only setting up this one port, go to step 8.)
6.	You may now select a layout for Port 2 (if available). With ***Port 1*** displayed, press **MENU** . . .	***Port 2*** is displayed.
7.	Repeat steps 3-5 to set up Port 2. Press **MENU** to set up Port 3 (if available). . .	***Port 3*** is displayed.
8.	Repeat steps 3-5 to set up Port 3. Press **MENU**. . .	***Inhibit*** is displayed.
9.	Press **ENTER** . . .	***YES*** is displayed.
10.	a. If you wish to inhibit the printout when motion is detected, press **ENTER**. . .	Yes is selected and ***Inhibit*** is displayed.
	b. If you do not wish to inhibit the printout when motion is detected, press **MENU**, then press **ENTER**. . .	No is selected and ***Inhibit*** is displayed.
11.	Press . . .	***GrouP 1*** is displayed.
12.	Press **MENU**. . .	***GrouP 2*** is displayed.
13.	Press **ENTER** . . .	***Port 1*** is displayed.
14.	Repeat steps 3-13 above to set up all the remaining groups.	

Freeze Force Function

Control

Whenever a 'freeze' action (assigned to hardware input and/or a serial input character) is executed, the current a-d value (at the output of the low-pass filter) is captured, or "frozen". An 'unfreeze' action (assigned to hardware and/or a serial input character) may be used to "unfreeze" the force value. These actions can only be executed while the instrument is in the display mode — they are ignored at any other time.

Display

Whenever Force is selected in the display mode, the frozen value is displayed (linearized and scaled as a normal force measurement) with the letter "F" as a prefix, in the form "F 1234.5". (If data capture is in progress, "b" is displayed instead of "F" or "C"). The 'Force' annunciator, 'Tension' or 'Compress' and a unit of measure annunciator are active to properly identify the frozen force value.

Keypad

The front panel keys perform their usual functions with the following modifications:

ESCAPE and **ENTER** immediately "unfreeze" the force value.

ZERO and **PEAK RESET** also unfreeze the force value in addition to their usual functions.

Outputs

Analog output, BCD output, cutoffs, bounds checking, printed force all use the live force, even if the force display has been frozen. The Disp. layout item provides a way to print frozen force if required. In this case, the force output is prefixed with an "F".

Data Capture

Control

Whenever a 'Capture' action (assigned to hardware input and/or a serial input character and/or Capture Start in the user menu) is executed, data capture is initiated. The current time and date are saved, and points are stored in memory at the configured capture rate. A 'Stop Cap.' action (assigned to hardware and/or a serial input character and/or Capture Stop in the user menu) may be used to halt the data capture. Otherwise, it continues until the specified number of points have been stored or until stopped as described below.

Display

While data capture is in progress, the first character of the display, in Force, Peak or 1st Peak display modes, is set to display "C" (If Frozen Force is displayed, a "b" is displayed instead of "C" or "F". (Serial output formatting is unaffected by this status indication.)

Keypad

The front panel keys perform their usual functions with the following modifications:

ZERO and **PEAK RESET** also stop data capture in addition to their usual functions.

ESCAPE and **ENTER** do not stop data capture. They are available to "unfreeze" the force display without interfering with the data capture function.

Entering the service menus halts data capture.

Changing loadcell selection (under the F1 key) halts data capture and deletes points.

Start and Stop are available under Capture in the user menu.

The menus under Capture in the user menu provide access to display, send and delete captured points and related statistical data.

Outputs

All outputs are unaffected by data capture.

Notes

The stored data are deleted in the following circumstances: via the Delete menus under Capture in the user menu, whenever the Setup menus are entered, whenever Reset Setup is performed.

Hardware input and serial input can start and stop the data capture only while the instrument is in the display mode.

Low Voltage, Load Cell Error or Lockup all cause the Data Capture to be halted. Overranged values are still stored, but displayed and printed in the same manner as other overranged values.

Data capture is disabled if the Capture Interval is set to zero or if Capture Points is set to zero.

Appendix A: ASCII Control Codes

Code #	Control Character	Code #	Control Character	Code #	Control Character	Code #	Control Character
0	NUL	33	!	66	B	99	c
1	SOH	34	"	67	C	100	d
2	STX	35	#	68	D	101	e
3	ETX	36	$	69	E	102	f
4	EOT	37	%	70	F	103	g
5	ENQ	38	&	71	G	104	h
6	ACK	39	'	72	H	105	i
7	BEL	40	(	73	I	106	j
8	BS	41	)	74	J	107	k
9	HT	42	*	75	K	108	l
10	Line Feed	43	+	76	L	109	m
11	VT	44	,	77	M	110	n
12	Form Feed	45	_	78	N	111	o
13	Carriage Return	46	.	79	O	112	p
14	S0	47	/	80	P	113	q
15	S1	48	0	81	Q	114	r
16	DLE	49	1	82	R	115	s
17	DC1	50	2	83	S	116	t
18	DC2	51	3	84	T	117	u
19	DC3	52	4	85	U	118	v
20	DC4	53	5	86	V	119	w
21	NAK	54	6	87	W	120	x
22	SYN	55	7	88	X	121	y
23	ETB	56	8	89	Y	122	z
24	CAN	57	9	90	Z	123	{
25	EM	58	:	91	[	124	|
26	SUB	59	;	92	\	125	}
27	ESC	60	<	93	]	126	~
28	FS	61	=	94	^	127	Delete
29	GS	62	>	95	-		
30	RS	63	?	96	`		
31	US	64	@	97	a		
32	Space	65	A	98	b		

NOTE: To repeat a control code a number of times, enter the control code #, a decimal, then the number of times you want it repeated. Spaces, letters, or carriage returns can easily be repeated this way.

Appendix B: Default Layouts and Examples

Layout 1: Label Force, Force, 1 SP , Units, 1 CR, 1 LF, End

Example: **F 2001 lbf**

Layout 2: Label Top, Top, 1 SP, Units, 1 CR, 1 LF, End

Example: **P 2001 lbf**

Layout 3: Label First, First, 1 SP, Units, 1 CR, 1 LF, End

Example: **I None lbf**

Layout 4: Label Display, Display, 1 SP, Units, 1 CR, 1 LF, End

Example: **F 2001 lbf**

Layout 5: Display, 1 CR, End

Example: **2001**

Layout 6: Ascii 2, Loadcell, 1 SP, Use 4, End

Example: **Loadcell 1 F 2001 lbf**

Layout 7: Use 3, Use 2, FF, End

Example: **I None lbf**

P 2001 lbf

Layout 8: Label Display, Display, 1 SP, Units, 1 SP, Hour, 1 SP, Day, 1 CR, 1 LF, End

Example: **F 2001 lbf 01:06 PM 06-25-97**

Layout 9: Db. Label, Db. Display, 1 SP, Db Units, 1 CR, 1 LF, End

Example: **F 2001 lbf**

Layout 10: Hour, 1 SP, Day, 1 CR, 1 LF, 9 By Db., FF, End

Example: **01:20 PM 06-25-97**

F 2001 lbf

F 1501 lbf-ft

F 501 lbf

Layout 11: D.C. Day, 1 SP, D.C. Hour, 1 SP, D.C. Rate, 1 CR, 1 LF, End

Example: **06-25-97 01:23 PM 0.017 s**

Layout 12: Ascii 4, D.C. First, 1 SP, Units, 2 SPS, Ascii 3, D.C. Top, 1 SP, Units, 2 SPS, Ascii 5, D.C. Ave., 1 SP, Units, 1 CR, 1 LF, End

Example: **1st Peak: 146 lbf Peak: 162 lbf Average: 137 lbf**

Layout 13: Point, 1 SP, D.C. Force, 1 SP, Units, 1 CR, 1 LF, End

Example: **201 -40 lbf**

Layout 14: Use 11, Use 12, 13 By D.C., FF, End

Example:

```
06-25-97 01:50 PM  0.017 s
1st Peak:  None lbf  Peak:   167 lbf  Average:  19 lbf
1   -40 lbf
2   -40 lbf
3   -40 lbf
4   -40 lbf
5   -40 lbf
6   -40 lbf
7   -40 lbf
8   -40 lbf
9   -40 lbf
10   -40 lbf
11   -40 lbf
•
•
•
128    14 lbf
129    14 lbf
130    14 lbf
131    14 lbf
132    14 lbf
•
•
•
219   -40 lbf
220   -40 lbf
221   -40 lbf
222   -40 lbf
223   -40 lbf
224   -40 lbf
```

Appendix C: Tips on setting up and using the Harmonizer®

To find the best settings for your filter needs, follow the steps listed below.

1. **What to Do:** Determine the amount of positive and negative force exerted by the vibration on the scale.

   How to Do It: Set Threshld to 0.0, Constant to OFF, and Average to 1.0 A-Ds. Return to Display mode and observe the force swings. Record the difference between the highest and lowest displayed force values. Add 30 to 50% to this value. This is a good starting value for the Threshld setting. Do not set your indicator to this value until told to in step 7.

2. Setting the Average to higher values increases the filtering effect.

   What to Do: Set Threshld to 0.0, Constant to OFF and Average to 15.0 A-Ds. Check the stability of the loadcell.

   How to Do It: Save changes and exit to Display mode. Observe the Center of Zero light. If it is on all the time your loadcell is stable within ¼ division. If the Center of Zero light blinks more filtering is required. Go to step 3.

3. Repeat step 2 but increase the Average by 15.0 A-Ds. Keep repeating steps 2 and 3 until the loadcell is stable or you've tried the entire range of Average (300 A-Ds). If the loadcell is still not stable go to step 4.

4. Setting the Constant to higher values increases the filtering effect.

   What to Do: Set Threshld to 0.0, Constant to 1.0 and Average to 300 A-Ds. Check the stability of the loadcell.

   How to Do It: Save changes and exit to Display mode. Observe the Center of Zero light. If it is on all the time your loadcell is stable within ¼ division. If the Center of Zero light blinks more filtering is required. Go to step 5.

5. Repeat step 4 but increase the Constant by 1.0. Keep repeating steps 4 and 5 until the loadcell is stable or you've tried the entire range of Constant (10). If the loadcell is still not stable, decrease your display update rate and start over at step 1 using the new, slower display rate.

6. After the Constant value is established you may wish to lower the Average value to improve display response time.

7. After a final value for Constant and Average has been set, enter the Threshld value established in step 1. If this value is too small your loadcell will act as if the filtering is off or not working. Increase the Threshld value until your loadcell stabilizes.

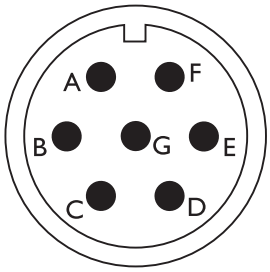
   If the Threshld value is too high your loadcell will react slowly to weight changes.

   When Harmonizer is properly adjusted the loadcell will be stable at zero and will rapidly display a stable test force value.

Appendix D: Cable Pinouts

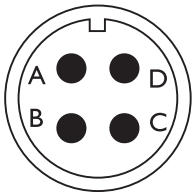
Loadcell Interface Cable (7-pin connector)

Below is an illustration of the loadcell interface cable and a table of pin assignments.



A	**- Signal**
B	**+ Excitation**
C	**+ Signal**
D	**- Excitation**
E	**- Sense**
F	**+ Sense**
G	**Ground**

Four Pin Connector



A	**Receive**
B	**Transmit**
C	**Clear to Send**
D	**Chassis Grnd**

UNITED STATES

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CANADA

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la Class A prescrites dans le Reglement sur le brouillage radioelectrique que edicte par le ministere des Communications du Canada.

CAUTION

Risk of electrical shock. Do not remove cover. No user serviceable parts inside. Refer servicing to qualified service personnel.

Weigh-Tronix reserves the right to change specifications at any time.

06/30/98 FI127USE.P65 PN 29653-0017B Printed in USA

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FI-127 Specifications

Power requirements:
115 Volts AC, +10% to -15% @ 0.3Amp maximum
230 Volts AC, +10% to -15% @ 0.15 AMP maximum
50/60 Hz

Excitation: 10 Volts DC
Supports up to twelve 350-ohm weight sensors

Operational keys:
Five yellow standard keys: Select, Peak Reset, Data Send, Zero, Units
Three function keys: F1, F2, F3
Numeric keys: 0-9

Operational annunciators:
Tension, Compression, Under, Accept, Over, Print, Zero, and Motion
Three units of measure

Display: Eight digit, seven segment, 0. 8-inch high LED

Display rate: Selectable (1, 2, 5, 10)

Analog to digital conversion rate: 60 times per second

Calibration Memory: Six loadcell calibration memory

Unit of measure:
Three, independently programmable:
Pounds force, kilograms force, grams force, ounces force, ton force, tonne force, custom, Off

Capacity selections:
999,999 with decimal located from zero to five places

Incremental selections:
Multiples and submultiples of 1, 2, 5

Programmable selections:
Zero range, motion detection, five-point linearization.

Time and date/RAM:
Battery backed up real time clock and RAM are standard

Internal resolution: 6,291,456 counts per mV/V per sec.

Harmonizer™ digital filtering:
Fully programmable to ignore noise and vibration

Standard inputs:
Seven logic level inputs for functions such as foot switch inputs, freeze reading inputs, PLC control, etc.

Standard outputs:
Three outputs, open collector design
Relay power supply, 24 VDC at 150mA
5 VDC at 200 mA for scanner power source
Bidirectional serial port (RS-232 or RS-422/485 or 20mA current loop)

Self diagnostics:
Display, keys, inputs, outputs, serial port,
A to D converter, loadcell output display, voltages

Circuitry protection: RFI, EMI, and ESD protection

Options:
Two additional serial ports
BCD parallel
10 cutoffs
Analog output
0-5, 0-10 volts
1-5, 4-20, 10-50 mA

Operating temperature:
-40 to 140° F (-40 to 60° C)
100% relative humidity including washdown

Enclosure: NEMA 4X stainless steel enclosure

Dimensions:
12" W x 8" H x 4" D (without mounting bracket)
12.3" W x 11.0" H x 5.3" D (with mounting bracket)

Weight: 12.5 lb, 5.7 kg

Agencies:
CUL pending

Warranty: 2 year